



# Epidemiologic Profile of Viral Hepatitis in Missouri—2015



Bureau of Reportable Disease Informatics

Division of Community and Public Health

Missouri Department of Health and Senior Services

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1.866.628.9891



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**Abbreviations**

<b>ACS</b>	American Community Survey	<b>JAIDS</b>	<i>Journal of Acquired Immune Deficiency Syndrome</i>
<b>AIDS</b>	Acquired Immunodeficiency Syndrome	<b>LPHA</b>	Local public health agency
<b>ASTHO</b>	Association of State and Territorial Health Officials	<b>MICA</b>	Missouri Information for Community Assessment
<b>BHCADD</b>	Bureau of Health Care Analysis and Data Dissemination	<b>MSM</b>	Men who have sex with men
<b>BHSH</b>	Bureau of HIV, STD, and Hepatitis	<b>NAS</b>	Neonatal abstinence syndrome
<b>BRDI</b>	Bureau of Reportable Disease Informatics	<b>NNDL</b>	National Notifiable Disease Listing
<b>CDC</b>	Centers for Disease Control and Prevention	<b>PAS</b>	Patient Abstract System
<b>CSR</b>	Code of State Regulations	<b>PDMP</b>	Prescription drug monitoring program
<b>CSTE</b>	Council of State and Territorial Epidemiologists	<b>PWID</b>	Persons who inject drugs
<b>DHSS</b>	Missouri Department of Health and Senior Services	<b>RSMo</b>	Revised Statutes of Missouri
<b>eHARS</b>	Enhanced HIV/AIDS Reporting System	<b>SAMHSA</b>	Substance Abuse and Mental Health Services Administration
<b>ER</b>	Emergency room	<b>SDP</b>	Section for Disease Prevention
<b>ESSENCE</b>	Electronic Surveillance System for the Early Notification of Community-based Epidemics	<b>STD</b>	Sexually transmitted disease
<b>HBV</b>	Hepatitis B virus	<b>TEDS</b>	SAMHSA Drug Treatment Episode Data set
<b>HCV</b>	Hepatitis C virus	<b>U.S.</b>	United States
<b>HEpi Profile</b>	Epidemiologic Profile of Viral Hepatitis in Missouri	<b>VHPP</b>	Viral Hepatitis Prevention Program
<b>HERR</b>	Health Education and Risk Reduction	<b>Vs</b>	Versus
<b>HIV</b>	Human Immunodeficiency Virus	<b>WebSurv</b>	Missouri Health Surveillance Information System
<b>ICD-10</b>	International Classification of Diseases, 10 <sup>th</sup> Revision		
<b>IDU</b>	Injection drug use		
<b>IRS</b>	Internal Revenue Service		

## Executive Summary

Hepatitis C is a viral infection that attacks the liver. If left untreated, hepatitis C can cause chronic liver disease, cirrhosis of the liver, liver cancer, and ultimately death. The *Epidemiologic Profile of Viral Hepatitis in Missouri (HEpi Profile) – 2015* describes the impact of the hepatitis C epidemic in Missouri. It focuses on hepatitis C surveillance data; special populations, including those affected by barriers to testing and treatment, Baby Boomers, and persons under 30 years of age; and these geographic regions most at risk for an outbreak – the Southeast Planning Region and the St. Louis Planning Region.

Hepatitis C surveillance data in Missouri are limited in that racial and clinical data are missing on many of the cases reported. Racial and symptomatic data are missing on approximately 40% and 99% of cases respectively. Missouri's 2015 incidence rate of acute hepatitis C was 0.1 cases per 100,000 population. The number of acute cases is severely underreported due to the lack of clinical information. Using Centers for Disease Control and Prevention (CDC) estimates, the actual rate could be as high as 1.8 cases per 100,000 population.

In 2015, there were 7,795 cases of chronic hepatitis C reported in Missouri. The median age of those reported was 49 years. Those aged 45 to 64 years had the highest percent (45.7%) of cases reported, followed by those aged 25 to 44 years (38.2%). Males had an incidence rate of 165.9 cases per 100,000 population which was 1.8 times higher than that for females (92.6). Blacks/African Americans (hereafter referred to as black) had the highest rate at 138.6 and represented 12.5% of reported cases, even though the black population accounts for only 11.6% of Missouri's total residents. While the St. Louis Planning Region had the most cases reported at 2,592 (33.3%), the highest rate was seen in the Southeast Planning Region, at 202.7 cases per 100,000 population. Thus, the Southeast Planning Region rate was 1.7 times higher than that of the St. Louis Planning Region.

Barriers to testing and treatment include being born in a foreign country, speaking a language other than English, unemployment and poverty, low educational attainment, and lack of health insurance. Those under 30 years of age are a population of growing concern due to an increase in injection drug use behaviors in this group that puts them at higher risk of hepatitis C infection. Those under 30 years of age accounted for 19.5% of all reported chronic hepatitis C cases in 2015 in

Missouri. Baby Boomers, persons born between 1945 and 1965, accounted for 3,354 (43.0%) of the 2015 reported cases of chronic hepatitis C in Missouri.

Opioid, especially heroin, use is on the rise in Missouri and nationally and is the leading risk factor for hepatitis C infection. Geographic analysis of death data related to opioid and heroin use reveals a noticeable pattern. Heroin-specific death rates are highest in the St. Louis metropolitan area.

The Southeast Planning Region is considered vulnerable for a hepatitis C outbreak, as eight of the counties in this region were identified in CDC's *County-Level Vulnerability Assessment for Rapid Dissemination of HIV (Human Immunodeficiency Virus) or HCV (Hepatitis C Virus) Infections Among Persons Who Inject Drugs, United States*. Rates of hepatitis C infection ranged from 48.4 cases per 100,000 population in Bollinger County to 698.9 in St. Francois County. Males accounted for approximately 70% of the cases reported in the Southeast Planning Region. Persons aged 25 to 44 years represented the largest proportion of reported hepatitis C cases at 51.2%.

The St. Louis Planning Region is also considered a vulnerable region, as it faces challenges such as high percentages of uninsured persons, poverty, and opioid- and heroin-related deaths. The St. Louis Planning Region saw a 19.0% increase in reported hepatitis C cases between 2014 and 2015. St. Louis City had an incidence rate of over 300 cases per 100,000 population in 2015.

In addition to explaining the impact of hepatitis C in Missouri, the *HEpi Profile* will be used to disseminate information on hepatitis C for planning purposes, to promote screening recommendations, and to inform policy makers of the need for prevention and care services. Current resource shortages do not allow for follow-up of Missouri hepatitis surveillance data elements or adequate testing and treatment. The *HEpi Profile* for the first time brings together a variety of hepatitis data sources to demonstrate the needs and gaps in Missouri's surveillance, prevention, and care services.

*Note:* All data contained in the Executive Summary are cited in the body of the report.



## Introduction

The *HEpi Profile* was designed to increase public and professional awareness and to drive policies for viral hepatitis prevention, care, and planning. The purpose of the profile is to document, interpret, and frame the dimensions and impact of the epidemic in local terms that can be used to heighten awareness and drive decision making. This first version of Missouri's *HEpi Profile* focuses primarily on hepatitis C. Specific goals of the *HEpi Profile* are to:

- 1) Explain the impact of hepatitis C virus in Missouri.
- 2) Disseminate statistical data regarding hepatitis C for planning purposes.
- 3) Promote screening recommendations for hepatitis C.
- 4) Inform policy makers of the need for hepatitis prevention and services within the state.

This project was funded in part through the Association of State and Territorial Health Officials (ASTHO) grant *Building State/Territorial Health Department Capacity to Develop & Utilize Viral Hepatitis Epidemiologic Profiles*. ASTHO has provided funding for select state health departments to develop dedicated viral hepatitis epidemiologic profiles.

## Hepatitis C Background

In Missouri, the number of hepatitis C infections has been on the rise over the past few years, with 7,803 new cases reported in 2015. An estimated 78,591 adults, or 1.3% of the adult population, in Missouri have been infected and/or are living with chronic hepatitis C.<sup>1,2</sup> Many adults infected with hepatitis C have no signs or symptoms; therefore, most remain unaware of their disease status. Left untreated, hepatitis C can result in chronic liver disease, cirrhosis, or liver cancer, which can be difficult to treat and often leads to recurrent hospitalizations, liver transplantation, or death.<sup>3</sup>

Currently, persons who inject drugs (PWID) are at highest risk, as injection drug use (IDU) is the primary risk factor for newly acquired hepatitis C infection. In general, the greatest number of new infections occur in persons under the age of 30, with a majority reporting IDU.<sup>4</sup> A second group at high risk is Baby Boomers (persons born between 1945 and 1965), many of whom were infected before the risks of bloodborne viruses were widely known.<sup>5</sup> However, age is not the only risk factor; lack of education, poverty, and unemployment are also risk factors. In fact, in early 2016, the *Journal of Acquired Immune*

*Deficiency Syndromes (JAIDS)* published a county-level vulnerability assessment that identified 220 vulnerable counties in 26 states which share these and other risk factors and are considered to be at risk of HIV and/or hepatitis C outbreaks.<sup>6</sup> Thirteen of Missouri's 115 counties were included in the list of vulnerable counties.<sup>7</sup>

Hepatitis C specifically contributed to at least 15,848 inpatient hospitalizations and 9,497 emergency room (ER) visits in 2014, the most recent year for which hospital and ER data are available.<sup>8</sup> Deaths related to hepatitis C have also increased over the past several years, with the disease contributing to the deaths of at least 1,366 Missourians from 2011 to 2015.<sup>9</sup> Hepatitis C-related morbidity and mortality will continue to climb if Missourians do not have access to life-saving hepatitis C testing and treatment.

## Viral Hepatitis Prevention Program Background

The focus of the Missouri Viral Hepatitis Prevention Program (VHPP) is to control and reduce hepatitis-associated morbidity throughout the state by providing prevention education to healthcare providers, at-risk populations, and the general public through the promotion of viral hepatitis testing within community healthcare settings. Provider education is mostly delivered through postal mailers due to the limited funding provided to the VHPP. However, the VHPP and the Health Education and Risk Reduction (HERR) unit, in cooperation with local drug treatment centers, provide monthly in-person trainings to at-risk clients on viral hepatitis. Additionally, two prison release programs within the state allow HIV, sexually transmitted disease (STD), and hepatitis prevention training by the VHPP and HERR every month to offenders in preparation for release.

Viral hepatitis surveillance funding in Missouri is essentially nonexistent. The Bureau of HIV, STD, and Hepatitis (BHS) within the Missouri Department of Health and Senior Services (DHSS) houses both the VHPP and the HERR units. These units have access to comprehensive HIV and STD surveillance data to assist with planning efforts focused on targeted interventions, testing, and social marketing campaigns. Unfortunately, the same robust level of viral hepatitis data does not exist. Such in-depth surveillance activities and data would allow DHSS to make more accurate and informed decisions on areas and populations most in need of interventions, testing, and marketing campaigns. As a result, DHSS would be able to more effectively serve individuals who are infected with or affected by viral hepatitis, thus optimizing health outcomes. Improved data and a dedicated

epidemiologic profile will maximize the management of funding resources so that efforts are more targeted, subsequently improving the impact of services provided. An added benefit of the viral hepatitis profile is the ability to better understand and identify with greater accuracy layered areas and populations where co-infections are occurring.

All viral hepatitis conditions are required to be entered into the Missouri Health Surveillance Information System (WebSurv), either by manual data entry or electronic laboratory reporting. Data entry staff are primarily located in the Bureau of Reportable Disease Informatics (BRDI) within the Section for Disease Prevention (SDP), which also houses BSHS. There is currently one full-time data entry person dedicated to entering hepatitis C laboratory results and one full-time data entry person dedicated to entering hepatitis B laboratory results. Additional BRDI data entry staff assist with hepatitis B and C data entry as needed. Local public health agencies (LPHAs) also enter hepatitis B and C results in WebSurv to a much lesser extent.

This epidemiologic profile aims to provide an initial cohesive report on hepatitis C that addresses stakeholders' needs and promotes actions to improve health outcomes. The following list describes how stakeholders will use the profile.

- DHSS will use the profile to provide evidence-based data to policy makers and other decision makers and to advocate for policy changes and/or increased funding.
- BSHS will use the profile to develop manuals to prevent and/or respond to outbreaks, to focus on high prevalence areas of the state for training and testing purposes, and to assess staffing needs.
- VHPP will use the profile to guide allocation of resources to areas that need training and testing.
- HERR will use the profile to help guide resources for trainings through development of educational materials, targeting of at-risk populations, and focus on higher prevalence areas.
- Community-based organizations and LPHAs, especially those found to be in high prevalence areas, will use the profile to help direct their available resources.
- The Comprehensive Prevention Planning Group and Viral Hepatitis Committee will use the profile to address prevention concerns for populations most at risk and those infected with HIV, STDs, and viral hepatitis.

- The general public is not expected to directly use the profile, but VHPP will use the profile to provide data to the general public in easy-to-understand formats such as fact sheets, infographics, website pages, brochures, etc.

## Data Sources

This section describes the various data sources used in the creation of the profile.

### Missouri's Socio-Demographic Characteristics

Population estimates from the Bureau of Health Care Analysis and Data Dissemination (BHCADD) are used to provide a description of Missouri's demographic characteristics that is similar to the description in the current *Epidemiologic Profiles of HIV, STD, and Hepatitis in Missouri*.

United States (U.S.) Population Migration Data from the Internal Revenue Service (IRS) is used to determine the areas with high net in-migration from other states or countries. Persons migrating from other areas may not be tested for viral hepatitis in the state of Missouri if their infection status is already known. Therefore, a higher net in-migration increases the possibility of having infected persons with a status unknown to Missouri.

Population data from the U.S. Census Bureau, American Community Survey (ACS) include data regarding persons born outside of the U.S., poverty, health insurance status, and educational attainment and are used to identify populations with potential barriers to services and healthcare and to identify areas with high percentages of poverty, unemployment, and lack of education in the state of Missouri. These measures can sometimes coincide with injection drug use, which is a risk factor for hepatitis C.

Missouri's County-level Study Profiles provide county-specific prevalence of chronic disease risk factors, conditions, and preventive practices and can help identify health disparities in different areas of the state. New data are expected to be available in 2017 and will be used to identify the geographic, demographic, and socio-demographic characteristics of persons in Missouri who do not have health insurance and who did not receive medical care in the past 12 months. The control of hepatitis is dependent upon identifying those who are infected. Those who do not have health insurance are less likely to be tested for hepatitis. Therefore, the number of persons with unknown hepatitis status increases as the number of uninsured persons increases.

## Hepatitis B and C Epidemic

Hepatitis surveillance data from WebSurv, Missouri's homegrown communicable disease registry, are broken down by disease, by geography, and by demographic characteristics.

The *County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States* report is a national assessment that identifies counties in the U.S. that may be vulnerable to an outbreak of HIV or hepatitis C among PWID. This assessment outlines results from an analysis conducted by CDC to identify U.S. counties where PWID appear to be particularly vulnerable to the rapid spread of HIV and/or hepatitis C infection. The findings from the analysis are limited to nationally available data that have been shown to be strong predictors of recent unsterile injection drug use and only point to *potential* vulnerability. The assessment identified 220 vulnerable counties across 26 states. Thirteen Missouri counties, concentrated in the southern region of the state, were identified as potentially vulnerable to an outbreak of HIV/hepatitis C. Therefore, the assessment is used to identify regions and populations to be analyzed in this profile.

WebSurv and enhanced HIV/AIDS (Acquired Immunodeficiency Syndrome) Reporting System (eHARS) data is combined to review hepatitis C/HIV and hepatitis B/HIV co-infections.

## Hospitalizations/Emergency Room Visits/Mortality

The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) provides data regarding ER visits associated with a chief complaint that may be related to hepatitis (hepatic illnesses, etc.) or alcohol and/or drug use.

Missouri Information for Community Assessment (MICA) is an interactive system developed to make health data accessible at the local level through an easy-to-use format. It allows users to summarize data, calculate rates, and prepare information in a graphic format. Data MICA users can access statistics on various health conditions and associated topics, including births, deaths, inpatient hospitalizations, ER visits, and population estimates, among others. Users can choose from among the many conditions, generate data tables by year of occurrence, age, gender, race, and county or zip code of residence, and obtain age-adjusted rates. Data MICAs also allow users to create charts and maps. All forms of output are available for download.

The MICA datasets are available at <https://webapp01.dhss.mo.gov/MOPHIMS/MICAHome>.

Following the enactment of 192.665-192.667, Revised Statutes of Missouri (RSMo), the Patient Abstract System (PAS) was implemented in 1993. It includes outpatient data as well as inpatient data. The outpatient data include ER patients, observation patients, and patients receiving invasive procedures on an outpatient basis, as well as patients receiving certain diagnostic procedures. The data collected since 1993 are maintained by DHSS. Since January 1, 1994, ambulatory surgical centers have also been required to report. Some of the data collected through the PAS is disseminated through the MICA web data query tool. More information about the PAS is available at <http://health.mo.gov/data/patientabstractsystem/index.php>.

Hepatitis-related deaths are determined by using death certificates from the Bureau of Vital Records for persons who have hepatitis B and/or C listed as a contributing factor of death.

## Missouri Behavioral Characteristics

The National Survey of Substance Abuse Treatment Services from the Substance Abuse and Mental Health Services Administration (SAMHSA) contains information regarding facilities that provide hepatitis B and hepatitis C screening and/or treatment.

The National Survey on Drug Use and Health from SAMHSA provides drug and alcohol use by age in Missouri.

The Treatment Episode Data Set (TEDS) from SAMHSA provides demographic characteristics of persons admitted into substance abuse treatment facilities, including the type of substance.

## Technical Notes

**Hepatitis Case Definition:** Case definitions, which are used for all national reportable conditions, are standardized sets of requirements that determine whether an individual is counted as a case for a particular disease. Case definitions allow states to count cases using standard criteria in order for data to be compared across the nation. When changes in testing technology and in the understanding of a disease occur, revisions to case definitions may occur. The information in this report are for 2015; therefore, the cases were classified using the 2012 case definitions. For more information, visit <https://www.cdc.gov/nndss/>.

**Date of Diagnosis:** This represents the date an individual was first diagnosed with the infection. However, in many instances the initial diagnosis of infection does not occur until several years after the initial infection, so the trends in diagnosed cases can only estimate actual trends in new infections.

**Place of Residence:** Data are presented based on an individual's residence at time of most recent diagnosis. Only cases whose most recent diagnosis occurred in Missouri are included in the analyses presented in the *HEpi Profile*. The residence at time of most recent diagnosis may or may not correspond with the individual's residence at the time of initial infection or to the current residence.

**Data Limitations:** Data release limitations are set to ensure that information cannot be used to inadvertently identify an individual. It is difficult to draw meaningful conclusions concerning trends in areas with low numbers of cases. Therefore, please interpret rates with a numerator of less than 20 cases with caution because of the low reliability of rates based on a small number of cases.

**Abbreviations:** A listing of abbreviations and terms is located at the beginning of the *HEpi Profile*. For clarification of any terms used, please contact BRDI for additional information.

**Race/Ethnicity:** In the text of this document, whenever cases are being discussed, the term “white” represents persons with a race of white and an ethnicity of not Hispanic or unknown, and “black” represents persons with a race of black/African American and an ethnicity of not Hispanic or unknown. The number of cases reported as “not Hispanic” may include individuals whose ethnicity was not reported. Individuals who reported multiple racial categories, whose race is unknown, or whose ethnicity is Hispanic are included in the category “other/unknown” or “two or more races/unknown” depending on the table or figure.

**Diagnoses in Correctional Facilities:** For persons incarcerated in Missouri correctional facilities, which include state, county, and local facilities, at the time of their diagnosis, the location of the correctional facility is considered the individual's residence at diagnosis. Data for persons diagnosed in Missouri correctional facilities are included in all data presented, as current surveillance data collection methods have no way to identify these individuals.

**Geographic Area versus Planning Region:** When data are presented by geographic area, the St. Louis City data represent individuals diagnosed within the St. Louis City limits. St. Louis County data represent individuals diagnosed in St. Louis County. Kansas City data represent individuals diagnosed within the Kansas City limits. Outstate data represents individuals diagnosed in all other areas. Refer to Figure 1.1 for the counties included in each planning region.

**Planning Regions:** Based on guidance from BSHS, the data in the *HEpi Profile* will utilize the same planning regions as those used for HIV prevention and care planning. This allows for consistency, as many of the resources for planning, care, and treatment and the populations served are similar or shared between HIV and hepatitis programs. Below is a list of the counties and cities included in each region, followed by a map of the planning regions (Figure 1.1).

**St. Louis Planning Region:** Franklin, Jefferson, Lincoln, St. Charles, St. Louis, St. Louis City, Warren

**Kansas City Planning Region:** Cass, Clay, Clinton, Jackson, Lafayette, Platte, Ray

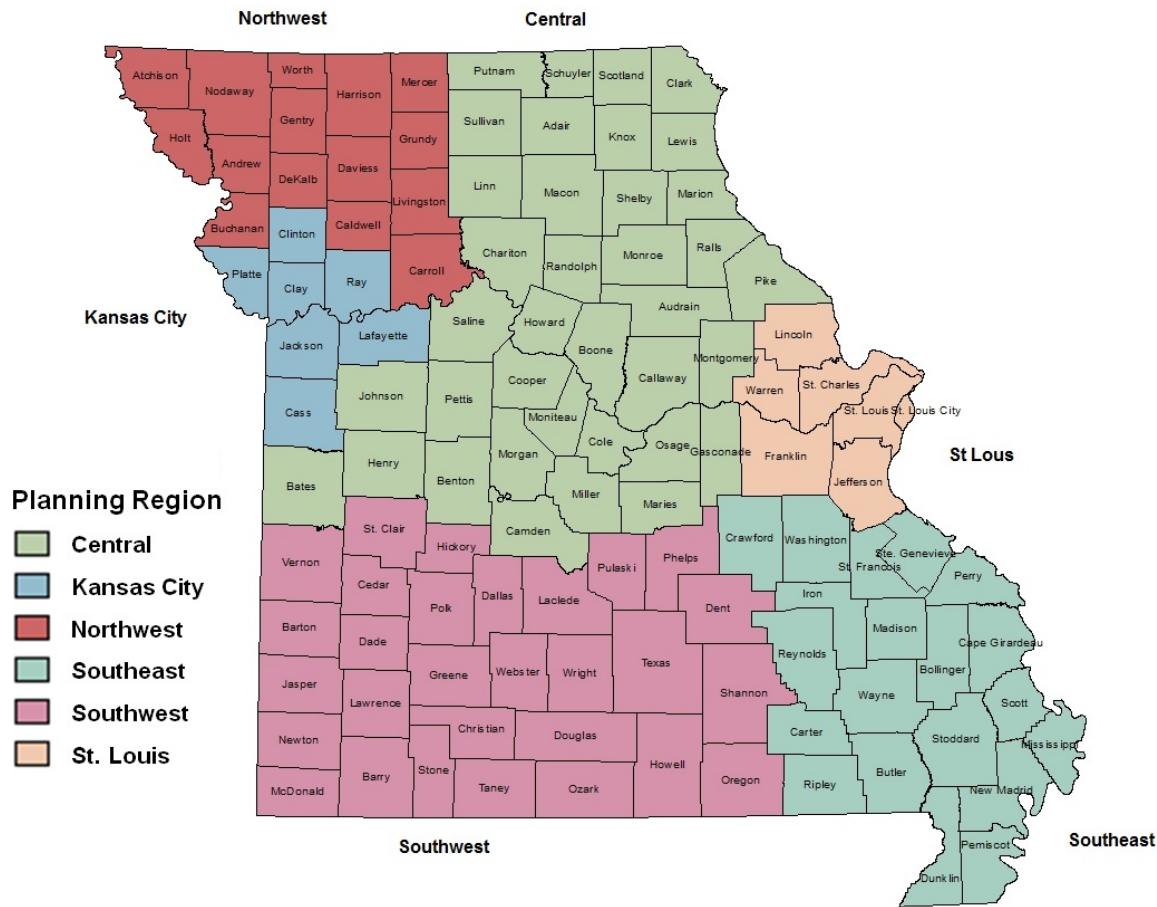
**Northwest Planning Region:** Andrew, Atchison, Buchanan, Caldwell, Carroll, Daviess, DeKalb, Gentry, Grundy, Harrison, Holt, Livingston, Mercer, Nodaway, Worth

**Central Planning Region:** Adair, Audrain, Bates, Benton, Boone, Callaway, Camden, Chariton, Clark, Cole, Cooper, Gasconade, Henry, Howard, Johnson, Knox, Lewis, Linn, Macon, Maries, Marion, Miller, Moniteau, Monroe, Montgomery, Morgan, Osage, Pettis, Pike, Putnam, Ralls, Randolph, Saline, Schuyler, Scotland, Shelby, Sullivan

**Southwest Planning Region:** Barry, Barton, Cedar, Christian, Dade, Dallas, Dent, Douglas, Greene, Hickory, Howell, Jasper, Laclede, Lawrence, McDonald, Newton, Oregon, Ozark, Phelps, Polk, Pulaski, Shannon, St. Clair, Stone, Taney, Texas, Vernon, Webster, Wright

**Southeast Planning Region:** Bollinger, Butler, Cape Girardeau, Carter, Crawford, Dunklin, Iron, Madison, Mississippi, New Madrid, Pemiscot, Perry, Reynolds, Ripley, Scott, St. Francois, Ste. Genevieve, Stoddard, Washington, Wayne

Figure 1.1: Missouri planning region map



## References

<sup>1</sup>CDC. "State-level HBV and or HCV Prevalence Estimates." In *1702 FOA Cooperative Agreement: Improving Hepatitis B and C Care Cascades: Focus on Increased Testing and Diagnosis, CDC Guidance Document for the Situational Analysis*. 12-06-2016. Appendix A (page 4).

<sup>2</sup>Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination. Requested population data set. Received 4-27-2016.

<sup>3</sup>CDC. "Hepatitis C FAQs for Health Professionals." Available at <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm>. Accessed 3-28-2017.

<sup>4</sup>Zibbel J, Iqbal K, Patel R, et al. "Increases in hepatitis C virus infection related to injection drug use among persons aged less than or equal to 30 years Kentucky, Tennessee, Virginia, and West Virginia." *Morbidity and Mortality Weekly Report*. 2015. 46(17): 453-459. Available at <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6417a2.htm>. Accessed 4-10-2017.

<sup>5</sup>CDC. "Hepatitis C FAQs for Health Professionals." Available at <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm>. Accessed 3-28-2017.

<sup>6</sup>Van Handel M, et al. "County-level vulnerability assessment for rapid dissemination of HIV or HCV infections among persons who inject drugs, United States." *Journal of Acquired Immune Deficiency Syndromes*. 2016. 73(3), 323-331. Available at <http://dx.doi.org/10.1097/QAI.0000000000001098>. Accessed 4-10-2017.

<sup>7</sup>*Ibid.*

<sup>8</sup>Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination. Requested data set. Received 3-20-2017.

<sup>9</sup>Missouri Department of Health and Senior Services. Bureau of Vital Statistics. Requested data set. Received 3-27-2017.



## Missouri State Population Summary

### Key Highlights

Missouri is the 18<sup>th</sup> most populous state, with just over six million (6,063,589) residents in 2014, based on U.S. Census Bureau estimates. Missouri's population increased by an estimated 1.2% between 2010 and 2014.<sup>1</sup> Missouri is located in the center of the United States. It is the 21<sup>st</sup> most extensive state by area, with just under 70,000 square miles, and is geographically diverse. Missouri is ranked 28<sup>th</sup> in density by population and land area. Missouri consists of 114 counties and the independent city of St. Louis (referred to as St. Louis City), which functions as its own county. The remainder of the *HEpi Profile* will therefore refer to "115 counties."<sup>1</sup>

### Age of Missouri's Population

In 2014, the median age in Missouri was 38.5 years which is slightly older than the U.S. median age of 37.7 years. Females

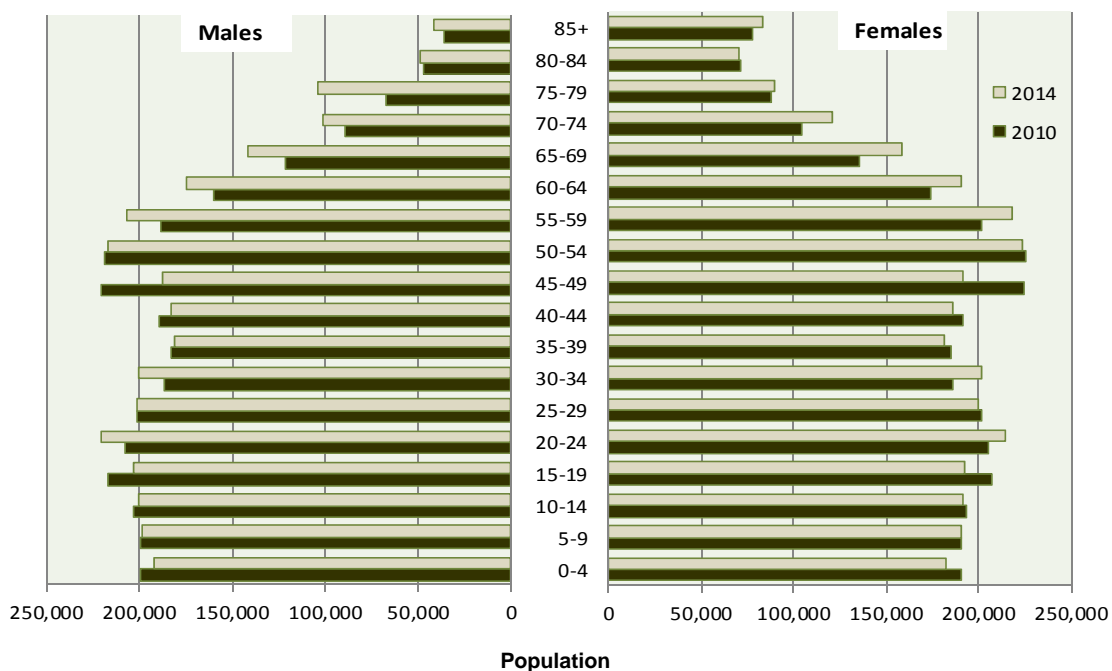
in Missouri tended to be slightly older than males. The median age was 37.1 years for males but 39.9 years for females. The median ages of males and females in Missouri were slightly higher than the median ages in the U.S. overall (36.3 and 39.0 years of age for males and females, respectively).<sup>2</sup> As Figure 2.1 shows, a little over half (3,144,893 or 51.9%) of Missouri residents are between the ages of 25 and 64 years old.<sup>3</sup>

The distribution of the Missouri population by age among both males and females shifted slightly between 2010 and 2014 (Figure 2.2).<sup>4</sup> In both 2010 and 2014, there were a larger number of males between the ages of 0 and 29 compared to females. However, there tended to be a larger number of females 40 years of age or older compared to males.

Figure 2.1: Population estimates, by age and planning region, Missouri, 2014

Age	St. Louis Planning Region	Kansas City Planning Region	Northwest Planning Region	Central Planning Region	Southwest Planning Region	Southeast Planning Region	Missouri Total
<2	50,744	31,185	5,364	20,646	28,701	12,191	148,831
2-12	290,709	176,817	30,269	117,525	162,258	69,783	847,361
13-18	165,174	94,019	16,966	67,092	91,642	38,468	473,361
19-24	163,225	87,530	21,459	95,303	109,639	39,772	516,928
25-44	550,891	321,944	54,131	209,662	277,816	119,634	1,534,078
45-64	581,074	313,463	58,926	227,651	295,126	134,575	1,610,815
65+	309,273	163,528	38,302	142,026	194,150	84,936	932,215
Total	2,111,090	1,188,486	225,417	879,905	1,159,332	499,359	6,063,589

Figure 2.2: Population estimates by age and sex, Missouri, 2010 and 2014



## Sex of Missouri's Population

In 2014, females represented 50.9% of Missouri's population. In all but one of the planning regions, females outnumbered males by a small margin. The Northwest Planning Region was the exception to this, as males outnumbered females (Figure 2.3).<sup>5</sup>

## Race and Ethnicity of Missouri's Population

In 2014, whites comprised 80.1% of Missouri's population; blacks/African Americans, represented the second largest race/ethnicity category in Missouri (11.6%, or 702,267 residents) (Figure 2.4).<sup>6</sup>

Whites represented the majority of the population in Missouri from 2010 to 2014. However, estimated population growth between 2010 and 2014 was greatest among Asian/Pacific Islanders with a 17.4% increase. Hispanics reported the second greatest percentage increase in population growth (13.1%) over the same time period.<sup>7</sup> These populations are included in the other race/ethnicity category in Figures 2.4 and 2.5. Large increases of more than 20% among blacks between 2010 and 2013 were concentrated in counties located in the Southwest Planning Region.<sup>8</sup> High rates of growth among particular populations may warrant attention when planning new disease prevention and outreach activities.

Figure 2.3: Population estimates, by sex and planning region, Missouri, 2014

	St. Louis Planning Region	Kansas City Planning Region	Northwest Planning Region	Central Planning Region	Southwest Planning Region	Southeast Planning Region	Missouri Total
<b>Sex</b>							
Male	1,019,242	578,929	113,357	438,276	576,170	248,248	2,974,222
Female	1,091,848	609,557	112,060	441,629	583,162	251,111	3,089,367
Total	2,111,090	1,188,486	225,417	879,905	1,159,332	499,359	6,063,589

Figure 2.4: Population estimates, by race/ethnicity and planning region, Missouri, 2014

	St. Louis Planning Region	Kansas City Planning Region	Northwest Planning Region	Central Planning Region	Southwest Planning Region	Southeast Planning Region	Missouri Total
<b>Race/Ethnicity</b>							
White	1,538,634	860,555	203,062	776,141	1,034,480	445,168	4,858,040
Black	409,518	184,363	8,348	44,078	24,223	31,737	702,267
Other	162,938	143,568	14,007	59,686	100,629	22,454	503,282
Total	2,111,090	1,188,486	225,417	879,905	1,159,332	499,359	6,063,589

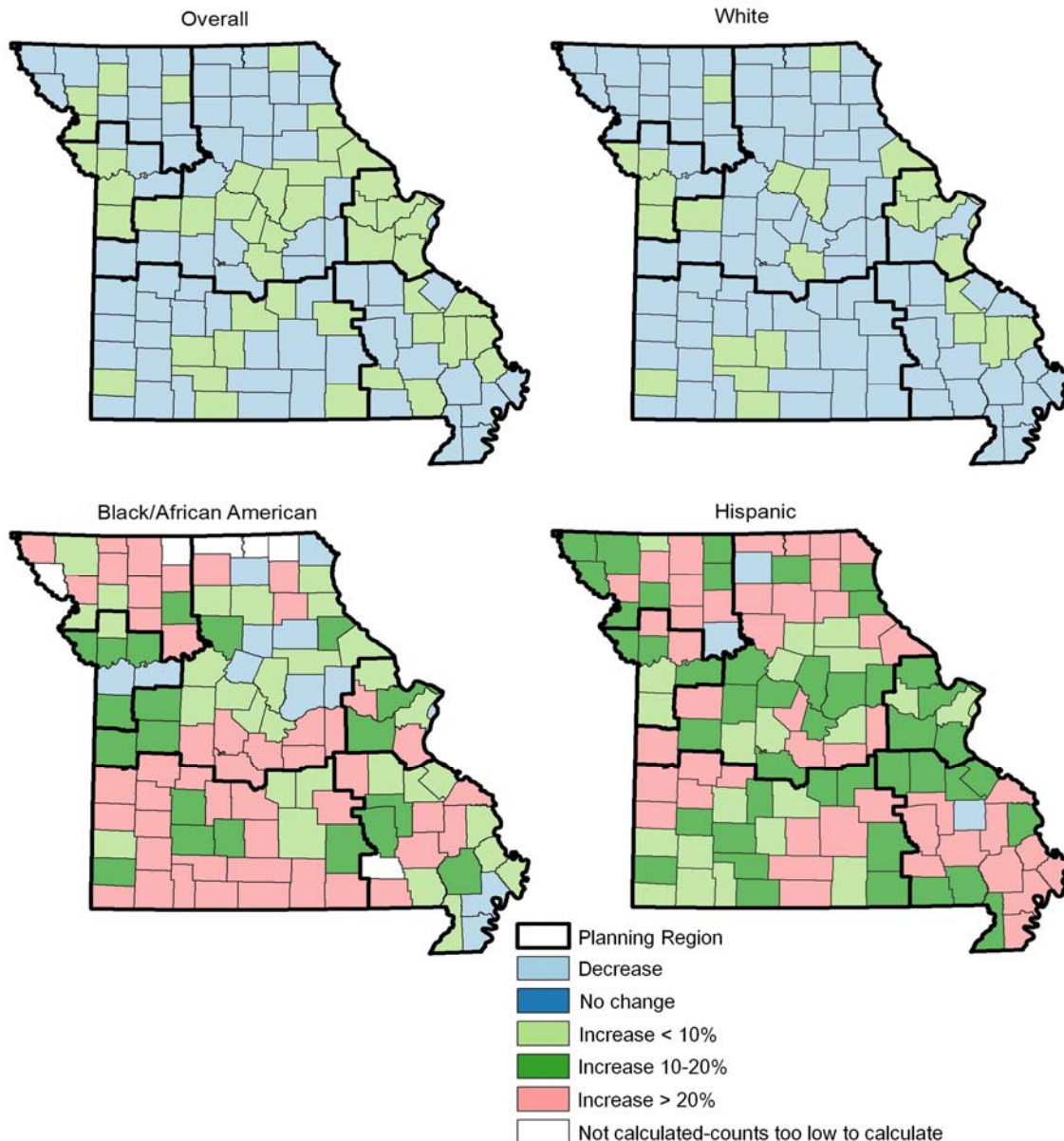
Figure 2.5: Population change, by race/ethnicity, Missouri, 2010-2014

	2010	2011	2012	2013	2014	% Change 2010-2014
<b>Race/Ethnicity</b>						
White	4,850,748	4,858,955	4,856,485	4,860,145	4,858,040	0.2%
Black	687,149	692,600	694,659	698,121	702,267	2.2%
Other	451,030	459,133	470,844	485,905	503,282	11.6%
Total	5,988,927	6,010,688	6,021,988	6,044,171	6,063,589	1.2%

No counties experienced an overall population increase of 10% or more between 2010 and 2013 (Figure 2.6). In 70 counties, the overall estimated population decreased between 2010 and 2013. Population changes among whites tended to be similar to overall population changes. In 47 counties, the estimated black population increased by more than 20% between 2010 and 2013. Many of the counties experiencing large increases in

black populations were located in the Southwest Planning Region. Large increases in the Hispanic population were seen throughout the state, with the exception of the St. Louis Planning Region. Counties with large Hispanic population increases included 17 counties in the Central Planning Region.<sup>9</sup>

Figure 2.6: Population change by county, overall and by race/ethnicity, Missouri, 2010-2013



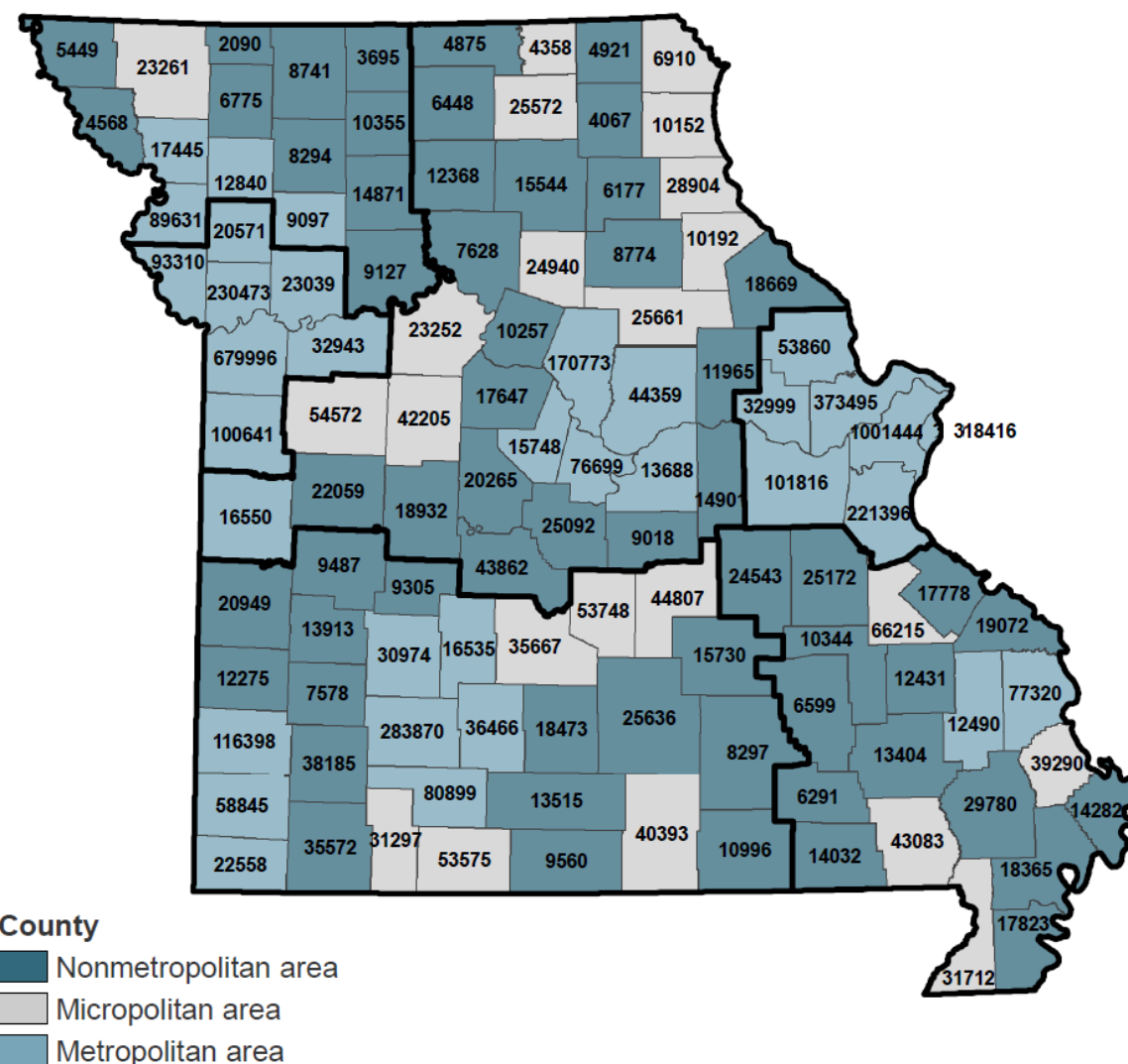


## Geographic Distribution of Missouri's Population

The U.S. Census Bureau defines groups of counties as metropolitan, micropolitan, or nonmetropolitan based on the population size of a core urban area. A metropolitan area contains a core urban area with a population of at least 50,000. It also includes adjacent counties that have a high degree of social and economic integration with the core urban area. A micropolitan area contains a core urban area with a population between 10,000-49,999. It also includes adjacent counties that have a high degree of social and economic integration with the core urban area. An area that does not meet the population requirements for the metropolitan or micropolitan area is

referred to as a nonmetropolitan area. Figure 2.7 illustrates the classification of Missouri counties based on 2013 population estimates. In total, 34 counties were classified as part of a metropolitan statistical area in 2013; 22 counties were classified as part of a micropolitan statistical area; and 59 counties were classified as nonmetropolitan areas.<sup>10</sup> At least one metropolitan statistical area was located in each of the six planning regions in 2013.<sup>11</sup> Missouri has eight border states; populations move fluidly between Missouri and neighboring states. Some of the micropolitan and metropolitan counties along the border get their status from a metropolitan area in the bordering state.

Figure 2.7: Population estimates and metropolitan statistical area classification, by county, Missouri, 2013



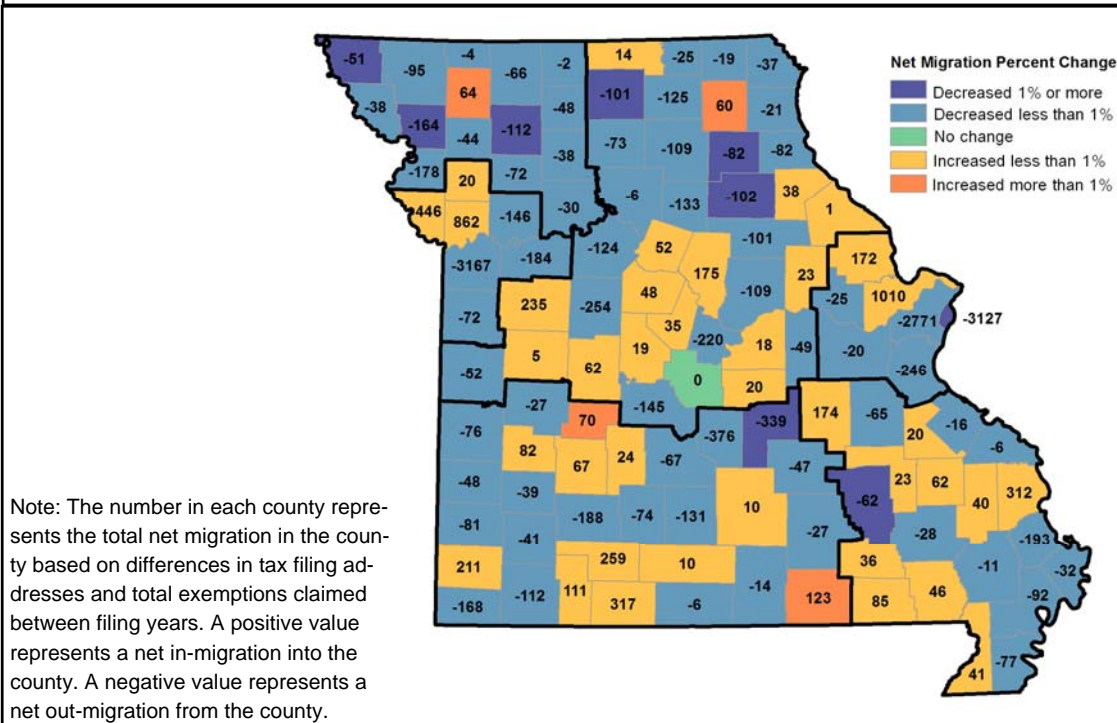
The number of exemptions filed on IRS returns reveals patterns of migration into and out of individual states. Between 2010 and 2011, the number of Missouri residents migrating out of the state increased by 9,610. The increased out-migration from Missouri was due to both an out-migration to other U.S. states (9,313) and to foreign countries (297).<sup>12</sup>

Among the counties in Missouri, 9 experienced a net out-migration of 1% or more of their population; 63 had a net out-migration of less than 1%; 1 had no change in migration; 38 had a net in-migration of less than 1%; and 4 had a net in-migration of 1% or more (Figure 2.8). The Northwest and Central Planning Regions contained the greatest number of

counties with a net out-migration of 1% or more (3). The Southwest Planning Region had the greatest number of counties with a net in-migration of 1% or more (2).<sup>13</sup>

Looking at migration patterns is important when discussing disease trends because in- and out-migration can quickly impact what services might be needed in an area. Many persons who migrate into a new area may not have complete medical records, which can cause delays in appropriate health care and/or treatment. These persons may also not know what services are available or how to access those services in their new area, which again delays appropriate health care and/or treatment.

Figure 2.8: Net migration and percent change in migration based on IRS tax returns, by county, Missouri, 2010-2011



### References

- <sup>1</sup>U.S. Census Bureau. "United States Summary: 2010, Population and Housing Unit Counts, 2010 Census of Population and Housing." Available at <https://www.census.gov/prod/cen2010/cph-2-1.pdf>. Accessed 3-07-2017.
- <sup>2</sup>U.S. Census Bureau. *Factfinder*. "B01002 Median Age by Sex 2014 American Community Survey 1-Year Estimates." Available at [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_14\\_1YR\\_B01002&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_B01002&prodType=table). Accessed 3-01-2017.
- <sup>3</sup>Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination. Requested data set. Received 4-27-2016.
- <sup>4</sup>*Ibid.*
- <sup>5</sup>*Ibid.*
- <sup>6</sup>*Ibid.*
- <sup>7</sup>*Ibid.*
- <sup>8</sup>U.S. Census Bureau. *Factfinder*. Files obtained from <http://factfinder2.census.gov>. For more information, see <http://www.census.gov>. For population estimates methodology statements, see <http://www.census.gov>. Accessed 2-24-2017.
- <sup>9</sup>Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination. Requested data set. Received 4-27-2016.
- <sup>10</sup>Missouri Census Data Center. "Core Based Metropolitan/Micropolitan Statistical Area—2013". Available at <http://mcdc.missouri.edu/websas/geocorr14.html>. Accessed 4-11-2016.
- <sup>11</sup>U.S. Census Bureau. *FactFinder*. "Health Insurance Coverage Status: B27001A, B27001B, B27001I." Available at <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t%20-%20none#>. Accessed 2-28-2017.
- <sup>12</sup>Internal Revenue Service. "SOI Tax Stats – Migration Data – Missouri." [Excel spreadsheets showing County to County Inflow, County to County Outflow, State to State Inflow, and State to State Outflow]. Available at <https://www.irs.gov/uac/soi-tax-stats-migration-data-missouri>. Accessed 4-10-2017.
- <sup>13</sup>*Ibid.*

## Hepatitis C Surveillance

DHSS maintains an integrated statewide surveillance system, WebSurv, that is used to collect, analyze, and produce reports on a wide variety of reportable diseases and conditions, including hepatitis C. Per the Missouri Code of State Regulations Title 19 (19 CSR 20-20.020), laboratories and medical providers are required to report hepatitis C laboratory results to DHSS within three (3) calendar days of first knowledge or suspicion of disease.<sup>1</sup> Acute and chronic hepatitis C became reportable conditions in Missouri in 1998. Prior to that, cases of hepatitis C infection were included in the condition named hepatitis, non-A non-B.

### Data Limitations

For many reportable conditions, disease investigators or surveillance staff follow up with providers and/or clients to obtain any missing data in the initial reports. Hepatitis C, however, has not been investigated on a case-by-case basis in Missouri as there have not been resources available for this purpose. Due to this lack of resources, the data presented in this section have several limitations.

The completeness of different basic demographic variables on hepatitis C reports varies considerably. In 2015, less than 1% of reported cases were missing an age at diagnosis. However, race was reported as unknown on 40.5% of hepatitis C acute and chronic cases, while ethnicity was reported as unknown for 58.6%. In 13.8% of all reported hepatitis C acute and chronic cases in 2015, a home address for the client was not included. Cases without a home address were assigned to a planning region based on the requesting provider's address.

The National Notifiable Disease List (NNDL) requires certain clinical criteria for classification of conditions. According to the acute hepatitis C 2012 case definition, a confirmed case of acute hepatitis C must have a discrete onset of any sign or symptom consistent with acute viral hepatitis and either jaundice or elevated ALT (alanine aminotransferase) levels.<sup>2</sup> Of the 7,795 chronic hepatitis C cases reported in Missouri, 7,723 (99.1%) did not have any symptoms reported. This is not to say the patients did not have symptoms but rather that the question of whether the patient had symptoms was unanswered. This lack of clinical information causes new, acute infections to be classified as chronic infections and distorts the true impact of hepatitis C in Missouri.

## Acute Hepatitis C

In 2015, Missouri reported eight acute hepatitis C cases to CDC, resulting in an incidence rate of 0.1 cases per 100,000 population. This is lower than the national average of 0.7 cases per 100,000 population reported in 2014, which is the most recent national data available. CDC estimates that the actual national number of acute hepatitis C cases is 13.9 times greater than the number reported.<sup>3</sup> Using this estimate, Missouri's incidence rate may be as high as 1.8 cases per 100,000 population.

The number of acute hepatitis C cases in Missouri is severely underreported. Therefore, it can be difficult to derive meaningful conclusions from such little available data.

## Chronic Hepatitis C

NNDL classifies a case as a chronic hepatitis C infection when the person is older than 18 months and has laboratory confirmed infection. Laboratory-confirmed infection is determined by a positive hepatitis C virus antibody screening test with a signal to cut-off ratio predictive of a true positive, a positive hepatitis C virus recombinant immunoblot assay, or a positive nucleic acid test. The patient also must not have reported clinical criteria that meets the acute hepatitis C case definition.<sup>4</sup>

Among the 40 states that reported hepatitis C conditions to CDC in 2014, Missouri and 12 other states accounted for 76.4% of all conditions.<sup>5</sup> In 2015, Missouri reported 7,795 cases of chronic hepatitis C, an increase of 24.2% from the 6,278 cases reported in 2014.

## Age

Missouri residents aged 45 to 64 years accounted for the highest percentage of reported chronic hepatitis C infections at 45.7% of all cases. The second highest percentage of cases reported was for the group aged 25 to 44 years, at 38.2% (Figure 3.1). These two age groups accounted for 83.9% of all cases reported in Missouri in 2015, even though they comprise only 51.8% of the total population. The hepatitis C virus is a blood-borne pathogen, so the risk factors that increase the chance of infection, such as injection drug use, are not risk factors typically associated with children or the elderly.

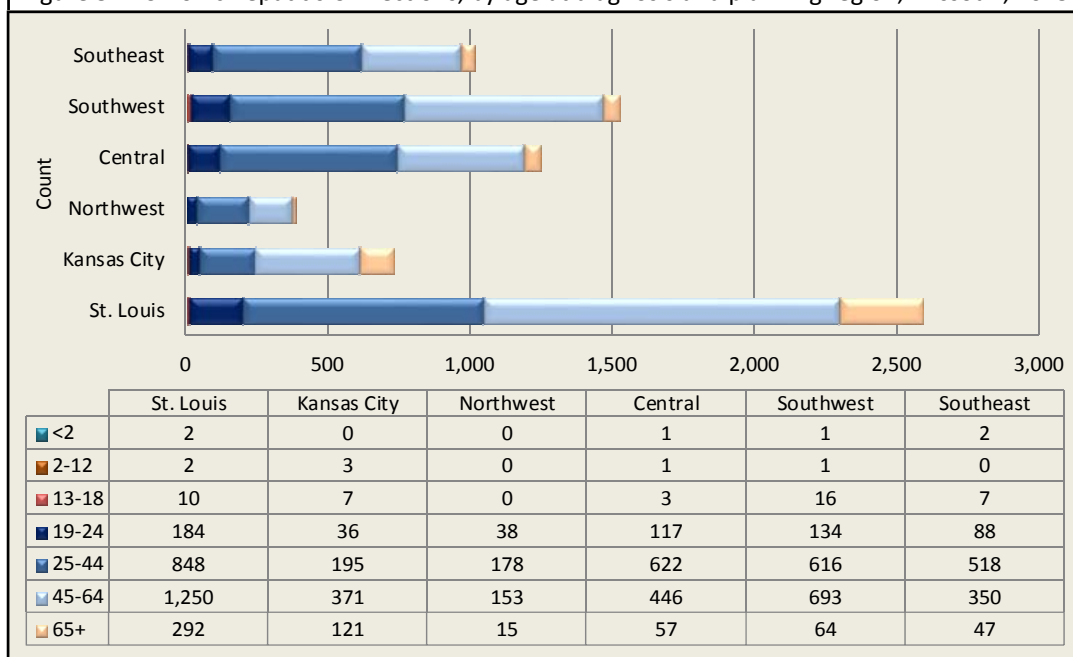
The St. Louis and Kansas City Planning Regions have larger numbers of cases in the 45 to 64 age group than in the 25 to 44 age group. The Northwest, Central, and Southeast Planning Regions have the reverse, in that their cases are mostly among the 25 to 44 age group, with the 45 to 64 group as the second largest. The Southwest Planning Region is unique, as it has similar case counts in these two age groups (Figure 3.2).

The median age of diagnosis for cases reported in 2015 was 49 years.

Figure 3.1: Chronic hepatitis C infections, by age at diagnosis, Missouri, 2015

AGE	FREQUENCY
<2	6
2-12	7
13-18	43
19-24	597
25-44	2,977
45-64	3,563
65+	596
Unknown	6
<b>Total</b>	<b>7,795</b>

Figure 3.2: Chronic hepatitis C infections, by age at diagnosis and planning region, Missouri, 2015



## Sex

Males accounted for 63.6% of reported chronic hepatitis C infections in 2015 and females only 36.7% (Figure 3.3). This is significant in that males and females each make up approximately half of Missouri's total population. The 2015 incidence rate for chronic hepatitis C infection among males (165.9 cases per 100,000 population) was 1.8 times greater than the incidence rate for females (92.6).

Combining information by sex and planning region reveals that the highest incidence rate was among males in the Southeast Planning Region, at 288.8 cases per 100,000 population. The

lowest incidence rate was for females in the Kansas City Planning region at 62.8 (Figure 3.4).

Age data reveal that the largest age-sex group in terms of reported hepatitis C chronic cases is males aged 45 to 64 (Figure 3.5). The median age at diagnosis for females was 42 years, which is slightly younger than the median age for males of 45 years.

Figure 3.3: Chronic hepatitis C infections, by sex, Missouri, 2015

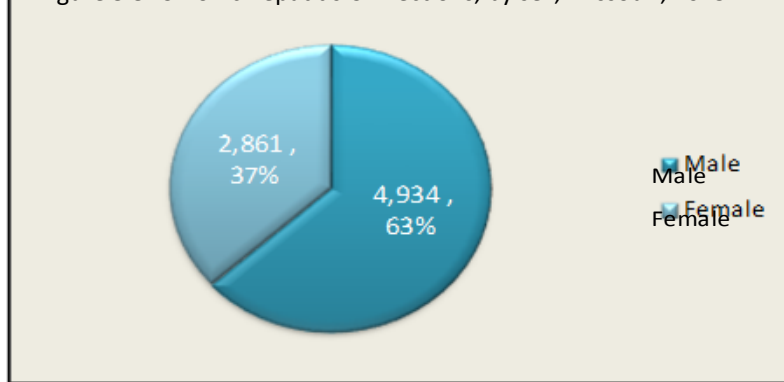
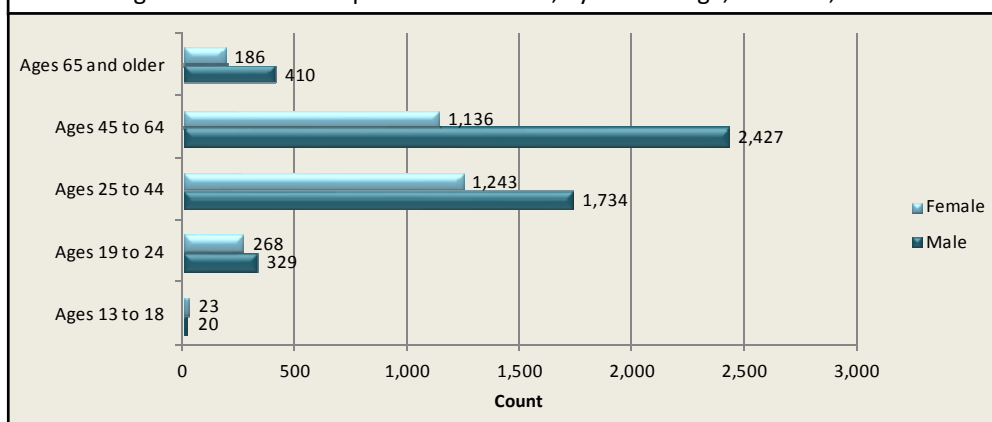


Figure 3.4: Chronic hepatitis C infections, by sex and planning region, Missouri, 2015

Region	Male		Female		Total	
	Count	Rate*	Count	Rate*	Count	Rate*
St. Louis	1,616	158.5	976	89.4	2,592	122.8
Kansas City	651	112.4	383	62.8	1,034	87.0
Northwest	264	232.9	120	107.1	384	170.4
Central	805	183.7	443	100.3	1,248	141.8
Southwest	881	152.9	644	110.4	1,525	131.5
Southeast	717	288.8	295	117.5	1,012	202.7
<b>Total</b>	<b>4,934</b>	<b>165.9</b>	<b>2,861</b>	<b>92.6</b>	<b>7,795</b>	<b>128.6</b>

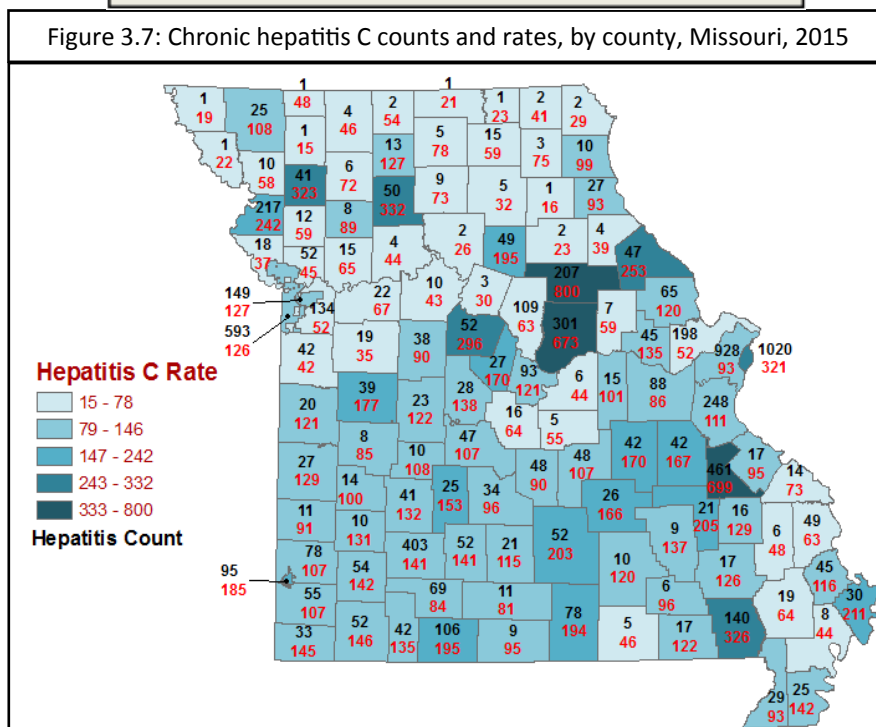
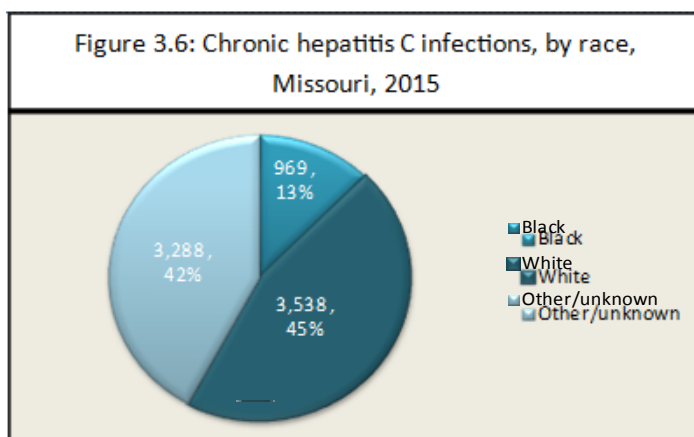
\*Rates are per 100,000 population

Figure 3.5: Chronic hepatitis C infections, by sex and age, Missouri, 2015



## Geographic Distribution

Among the planning regions, the Southeast Planning Region had the highest rate, at 202.7 cases per 100,000 population. This is 1.7 times higher than the St. Louis Planning Region's incidence rate of 122.8 cases and 2.3 times higher than the Kansas City Planning Region's rate of 87.0 cases. The Northwest Planning Region had the second highest incidence rate, at 170.4 cases per 100,000 population, even though that region had the fewest reported cases (384) of any region.





### Longitudinal Trends

The number of chronic hepatitis C cases reported in Missouri increased 48.6% between 2006 and 2015, from 5,246 cases to 7,795 cases. As Figure 3.8 below shows, reported cases of chronic hepatitis C infection in Missouri increased each year since 2012. The declines in reported cases between 2010 and 2012 can be attributed to resource shortages. During those years, not all laboratory reports received by DHSS were reviewed for case definition compliance nor reported to CDC. In May 2013, BRDI was created and resource shortages were addressed to assure all reported cases were reviewed and reported.

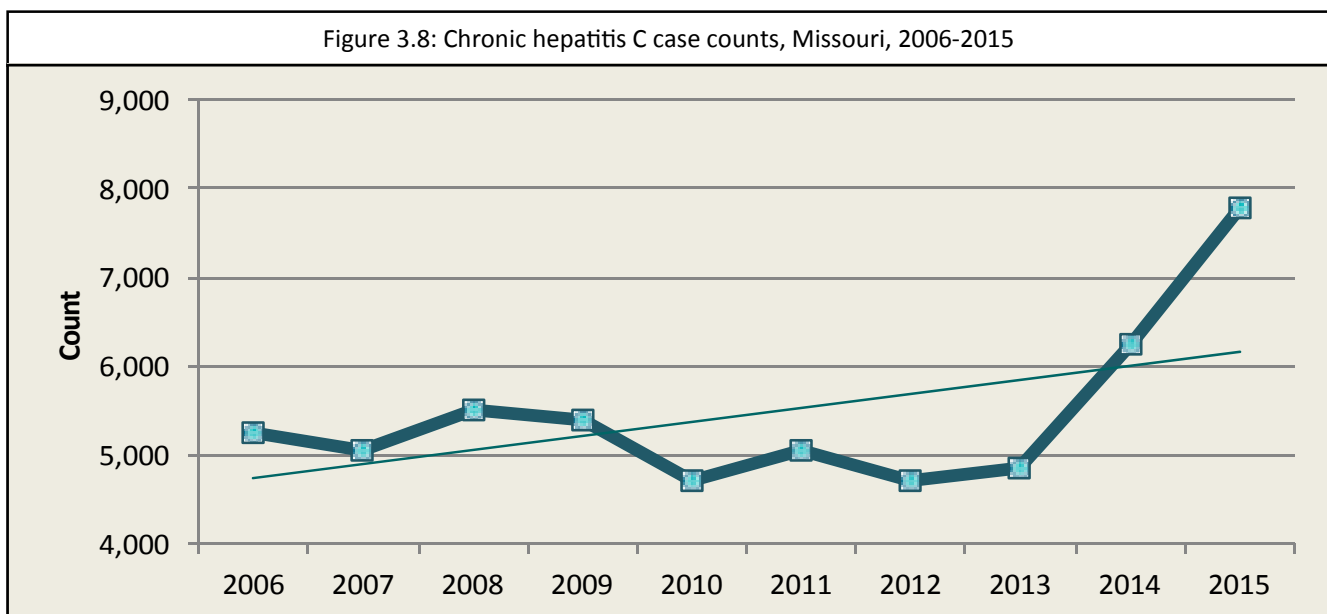
The most dramatic increase in numbers of reported chronic hepatitis C cases occurred from 2013 to 2015, with a 60.6% increase from 4,855 cases to 7,795 cases. The numbers of reported cases in 2014 and 2015 were greater than the expected values, as shown by the linear trend line, which is based on the number of reported cases in the overall time period (Figure 3.8).

The specific reason for such large increases in the number of reported chronic hepatitis C cases is unknown, but there are several factors that may have contributed. DHSS, along with many partner organizations on both the federal and community levels, provided educational and outreach opportunities over the last few years to increase awareness of

the need for hepatitis C testing. One reason for the increase in reported hepatitis C cases may be a product of these campaigns, which increased testing. If more people are tested, increases in reported cases are expected, as those who previously went undiagnosed and unreported would now be diagnosed and reported. Along with more general awareness of hepatitis C, there are now effective treatment regimens to treat and cure hepatitis C infection. As the infection is now treatable, more providers are willing to test patients, and patients are more willing to be tested.

Another possible reason for the increase in reported cases is better surveillance of hepatitis C than in previous years. As more dedicated resources and funding become available to combat the rising hepatitis C epidemic, more complete and comprehensive data will follow. The American Recovery and Reinvestment Act of 2009 authorized the Centers for Medicare and Medicaid Services to make incentive payments to eligible professionals and eligible hospitals demonstrating meaningful use of electronic health records technology. One aspect of the meaningful use initiative includes a requirement to report electronic laboratory results to the public health organizations including DHSS.<sup>6</sup> This electronic exchange of reportable condition laboratory information increased DHSS's ability to capture more complete hepatitis C laboratory result data and freed up other resources that are now used to enhance existing surveillance activities.

Figure 3.8: Chronic hepatitis C case counts, Missouri, 2006-2015





## Age

While reported chronic hepatitis C cases increased overall from 2006 to 2015, increases have not been consistent across all age groups (Figure 3.9). In 2015, the incidence rate for those aged 19 to 24 years was 115.5 cases per 100,000 population. This is a 148.6% increase from the 2006 incidence rate of 46.5 for this age group. Similarly, the 65 years and older age group increased from a rate of 28.8 in 2006 to 63.9 in 2015. The only age group that experienced a decrease in its incidence rate is the under 2 age group, which declined 9.6% from 2006 to 2015. However, this may be misleading as the percent of change was based on small numbers, with an actual change of only one fewer case reported.

## Sex

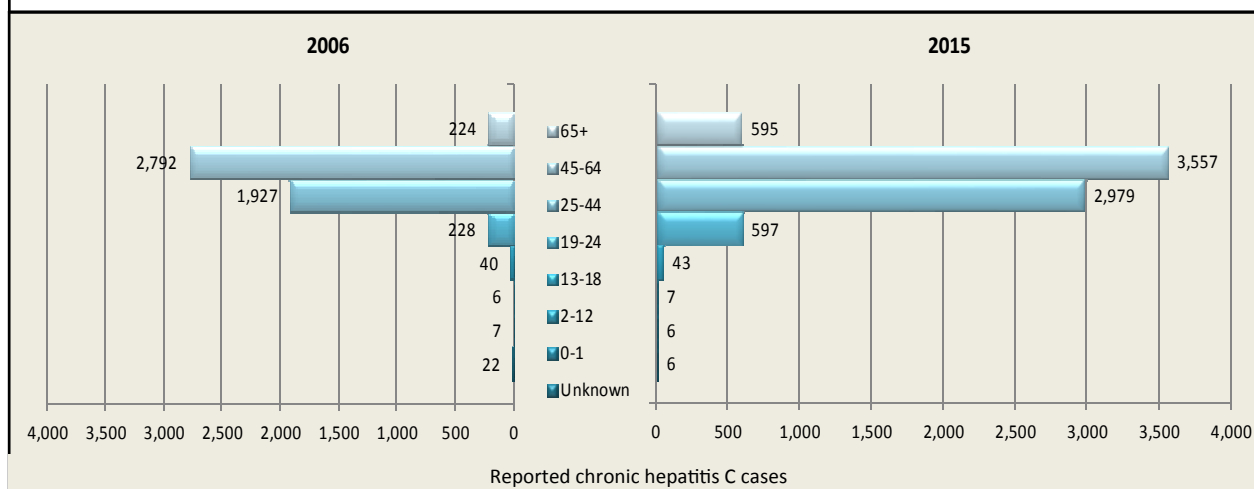
While the numbers of cases varied in the last five years, the percentage of reported chronic hepatitis C cases in males compared to females remained steady, with approximately 63% of cases in males and 37% in females. From 2011 to 2015, the incidence rates for males and females both rose similarly, with 33.9% and 35.5% increases, respectively.

## Race

For 2011 through 2013, the black rate of newly infected cases per 100,000 population was below that of Missouri overall. However, the black rate grew more quickly and began to surpass the state rate in 2014 by a small difference of 114.8 to 113.6 cases. By 2015, the difference had grown to a rate of 149.6 new cases among blacks, while the total Missouri rate was only 139.8 cases.

While it is difficult to look at longitudinal data for race, as many cases do not have a race indicated, efforts have been made to improve these data. Some success has been achieved. In 2011, 54.4% of all reported chronic hepatitis C cases were missing race. In 2015, that percentage dropped to 40.5%. Strategies are being developed to continue to improve these data.

Figure 3.9: Chronic hepatitis C case counts by age group, Missouri, 2006 and 2015



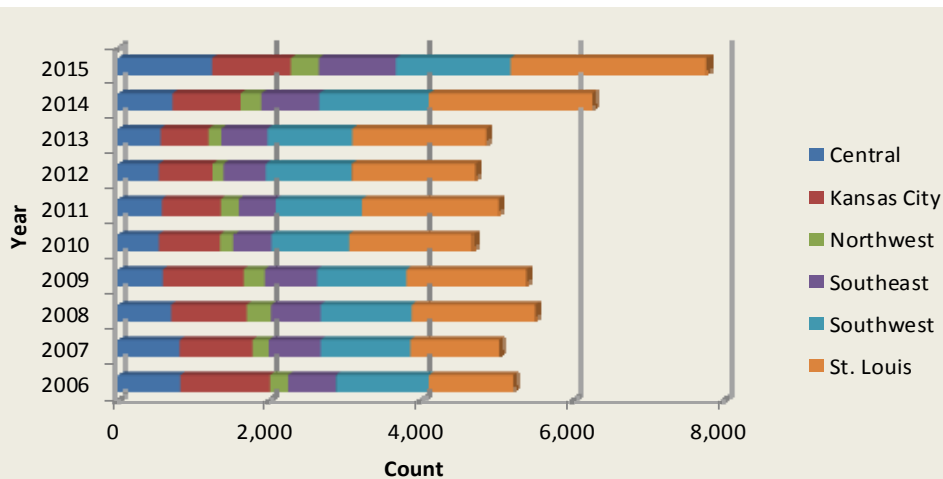
### Geographic Distribution

As shown in Figure 3.10, all but one planning region experienced an increase in reported chronic hepatitis C cases over the last ten years. The Kansas City Planning Region saw a 12.7% decrease in reported cases from 2006 to 2015. In stark contrast, the St. Louis Planning Region on the opposite side of the state saw a 128.8% increase in reported cases during the same time period. While the Northwest Planning Region consistently reported the fewest number cases each year, it had a 71.4% increase in the number of cases reported. While this is a large percentage increase, to put it in perspective, the 10-year total of reported cases for the Northwest Planning Region (2,469) included fewer cases than the St. Louis Planning Region (2,592) reported for 2015 alone.

### References

- <sup>1</sup>Missouri Secretary of State. "Code of State Regulations: Title 19 - Department of Health and Senior Services." Available at <http://www.sos.mo.gov/cmsimages/adrules/csr/current/19csr/19c20-20.pdf>. Accessed 4-09-2017.
- <sup>2</sup>CDC. "National Notifiable Diseases Surveillance System (NNDSS) Hepatitis C, Acute 2012 Case Definition." Available at <https://www.cdc.gov/nndss/conditions/hepatitis-c-acute/case-definition/2012/>. Accessed on 3-08-2017.
- <sup>3</sup>CDC. "Viral Hepatitis—Hepatitis C Information—Statistics and Surveillance." Available at <https://www.cdc.gov/hepatitis/hcv/statistics/hcv.htm>. Accessed on 3-16-2017.
- <sup>4</sup>CDC. "National Notifiable Diseases Surveillance System (NNDSS) Hepatitis C, Past or Present 2012 Case Definition." Available at <https://www.cdc.gov/nndss/conditions/hepatitis-c-chronic/case-definition/2012/>. Accessed on 4-09-2017.
- <sup>5</sup>CDC. "Viral Hepatitis—Hepatitis C Information—Statistics and Surveillance." Available at <https://www.cdc.gov/hepatitis/hcv/statistics/hcv.htm>. Accessed on 3-16-2017.
- <sup>6</sup>Missouri Department of Health and Senior Services. "Meaningful Use." Available at <http://health.mo.gov/atoz/mophie/>. Accessed 4-09-2017.

Figure 3.10: Chronic hepatitis C case counts, by planning region, Missouri, 2006-2015



## Special Populations and Risk Factors

### Barriers to Testing and Treatment

Birth outside the U.S. can be a barrier to testing and treatment for hepatitis C. In the U.S., foreign-born persons may have difficulty finding a provider who is culturally sensitive. Persons born in the U.S. can also have difficulty navigating the complex intricacies of health insurance coverage and care. These difficulties increase for persons who are less familiar with the health care system in the U.S.

Overall, about 4% of Missouri's population was born outside of the U.S., according to 2011-2013 ACS estimates. Estimates of the percent of the population born outside of the U.S. by county are available only for selected counties. Estimates for

the available counties ranged from 0.3% in Randolph County to approximately 9% in McDonald County (Figure 4.1).<sup>1</sup>

Among persons born outside the U.S. who now currently reside in Missouri, the largest numbers were born in Asia (Figure 4.2). The three countries representing the largest number of births among persons born in Asia included China (16,790), India (16,332), and Vietnam (11,166). Central America represented the second-largest region of birth among persons residing in Missouri. The majority of these persons were born in Mexico (39,072), making Mexico the country with the largest number of foreign-born persons residing in Missouri.<sup>2</sup>

Figure 4.1: Estimated percent of population born outside the U.S., by selected county, Missouri, 2011-2013

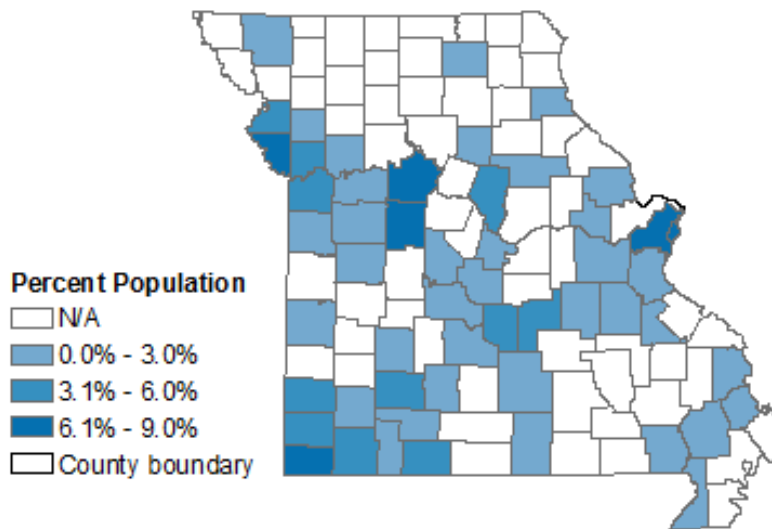
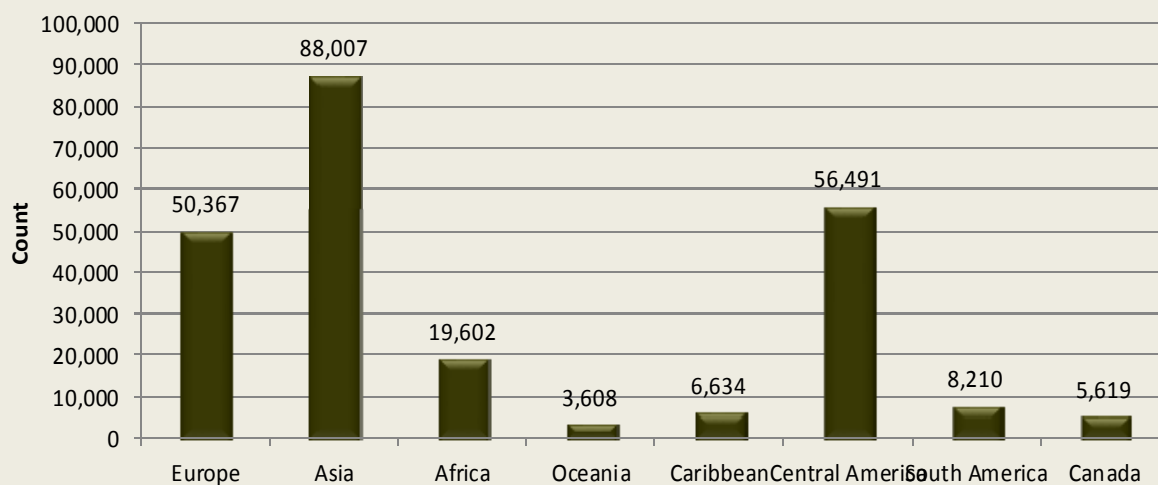


Figure 4.2: Region of birth among persons born outside the U.S., Missouri, 2011-2013



English is the predominate language spoken in Missouri. Speaking a language other than English or not speaking English well is a barrier to health care, as finding a provider who speaks another language can be difficult, especially in rural areas of the state.

Among Missourians five years of age or older, an estimated 6% spoke a language other than English at home, according to 2014 American Community Survey estimates. Estimates of the percent of the population speaking a language other than English at home by county were available for only a few selected counties. Estimates of persons five years of age or older who speak a language other than English at home ranged from 3% in Callaway and Jefferson Counties to 12% in Pulaski County (Figure 4.3).<sup>3</sup>

An estimated 94% of Missourians five years of age or older spoke only English at home. Other than English, the most common language spoken at home among Missourians five years of age or older was Spanish or Spanish Creole (2.3%). Less than 4% of Missouri's population five years of age or older spoke a language other than English, Spanish, or Spanish Creole.<sup>4</sup>

Among Hispanic Missourians five years of age or older, an estimated 50% spoke only English at home; less than 1% spoke a language other than English or Spanish at home (Figure 4.4). Overall, an estimated 89% of persons of Hispanic origin identified being comfortable speaking English (i.e., spoke English well or better). An estimated 3% reported speaking Spanish at home and were not able to speak English. An additional 8% spoke Spanish at home and reported not being able to speak English well.<sup>5</sup>

Figure 4.3: Estimated percent of population five years of age or older speaking a language other than English at home, by selected county, Missouri, 2011-2013

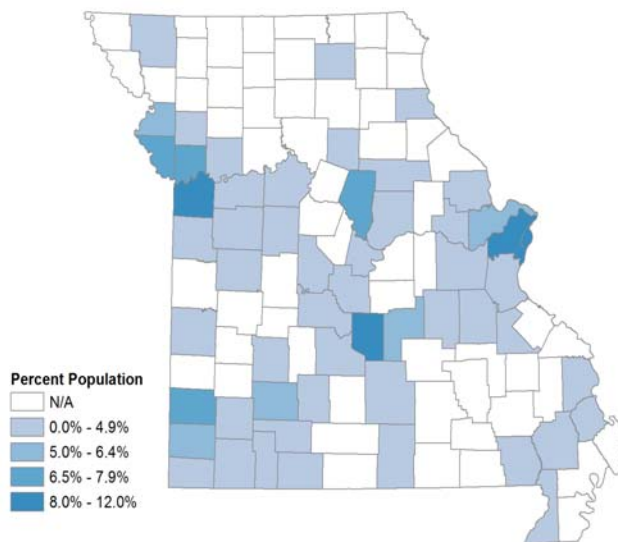
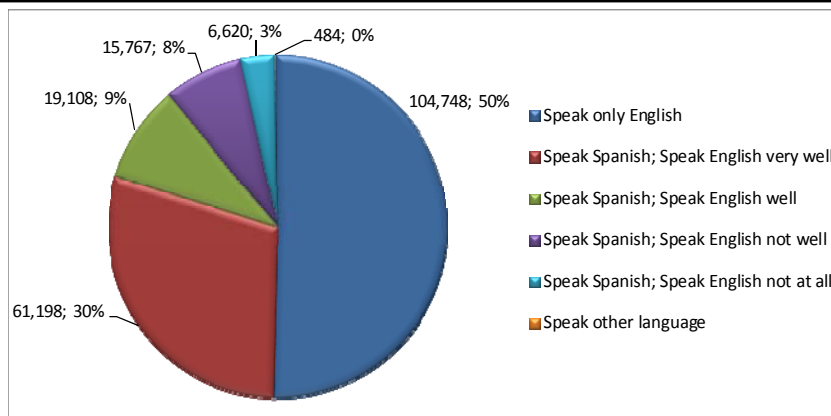


Figure 4.4: Estimated percent of Hispanic population five years of age or older, by language spoken at home and ability to speak English, Missouri, 2011-2014



Health insurance coverage is often offered as a benefit of employment. Persons who are unemployed often do not have health insurance coverage. Poverty and unemployment are barriers for hepatitis C testing and treatment. Testing is not considered by most health insurance plans to be part of routine care and therefore is not covered by insurance. The same also applies to treatment for hepatitis C, which is very expensive. For those who do not have insurance, affordable testing and treatment are not available.

An estimated 16% of Missourians lived in poverty between 2009 and 2013. Poverty rate estimates ranged from 5.8% in St. Charles County to 29.0% in Pemiscot County (Figure 4.5). Counties with the highest percentages of poverty were concentrated in the Southeast Planning Region.<sup>6</sup>

An estimated 7% of Missourians age 16 and older were unemployed, according to 2014 ACS estimates. The unemployment rate generally decreased as age increased. Among persons 20 to 64 years of age, the unemployment rate was similar between males and females. However, the unemployment rate was greater for females 20 to 64 years of age with their own children under the age of six. Unemployment rates decreased as educational attainment rose among persons 25 to 64 years of age.<sup>7</sup> Unemployment among persons 16 years of age or older was higher for minorities compared to whites (Figure 4.6).<sup>8</sup>

Figure 4.5: Estimated percent of population living in poverty, by county, Missouri, 2009-2013

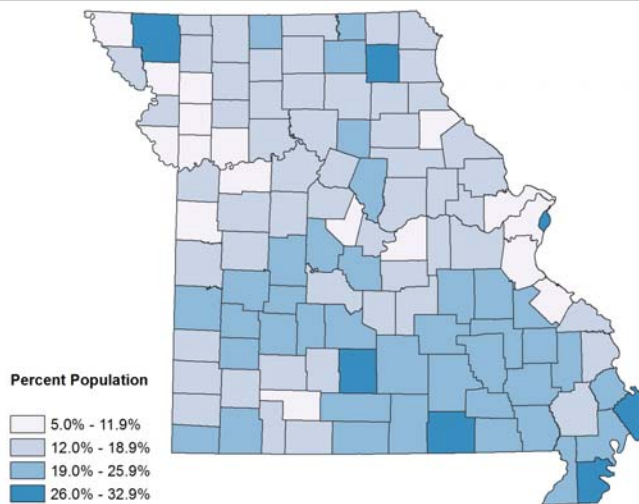


Figure 4.6: Estimated unemployment rate, by age, by race/ethnicity, by sex, and by educational attainment, Missouri, 2014

Ages Included in Measurement	Category	Unemployment Rate Range
16+ years of age	<b>Total</b>	<b>6.5 - 7.1%</b>
	<b>Age</b>	
	16 to 19 years	15.8 - 19.4%
	20 to 24 years	10.8 - 12.8%
	25 to 44 years	6.4 - 7.2%
	45 to 54 years	4.5 - 5.3%
	55 to 64 years	3.6 - 4.6%
	65 to 74 years	2.4 - 3.6%
	75 years and over	1.2 - 3.4%
	<b>Race/Ethnicity</b>	
20-64 years of age	White*	5.5 - 6.1%
	Black	12.9 - 15.3%
	Hispanic	5.4 - 8.6%
	<b>Total</b>	<b>6.1 - 6.7%</b>
	<b>Sex</b>	
	Male	6.5 - 7.3%
	Female	5.5 - 6.3%
	Females with own children under 6 years	7.0 - 9.0%
	<b>25-64 years of age</b>	<b>Total</b>
	Educational attainment	
25-64 years of age	Less than high school graduate	12.6 - 16.0%
	High school graduate or equivalent	6.8 - 8.2%
	Some college or associate's degree	5.1 - 6.1%
	Bachelor's degree or higher	2.5 - 3.1%

Lack of a high school diploma or equivalent can be a barrier to hepatitis C testing and treatment as it can lead to high rates of unemployment and poverty. An estimated 12% of Missourians 25 years of age or older have not completed at least high school or a high school equivalency. Estimates by county were available only for selected counties. Estimates ranged from 58.0% of the population completing high school in Adair County to 85.0% in Platte County (Figure 4.7).<sup>9</sup> This means that more than one-third of Adair residents age 25 years or older lack a high school diploma or equivalent.

The distribution of highest educational attainment level was similar between males and females based on 2014 estimates. However, it varied greatly by race/ethnicity (Figure 4.8). Greater proportions of whites completed a bachelor's degree or higher compared to blacks. The percentage of the population with less than a high school diploma was greatest among Hispanic females (28.9%) and lowest among white females (9.9%).<sup>10</sup>

Figure 4.7: Estimated percent of population 25 years of age or older completing high school, high school equivalent, or higher, by selected county, Missouri, 2011-2013

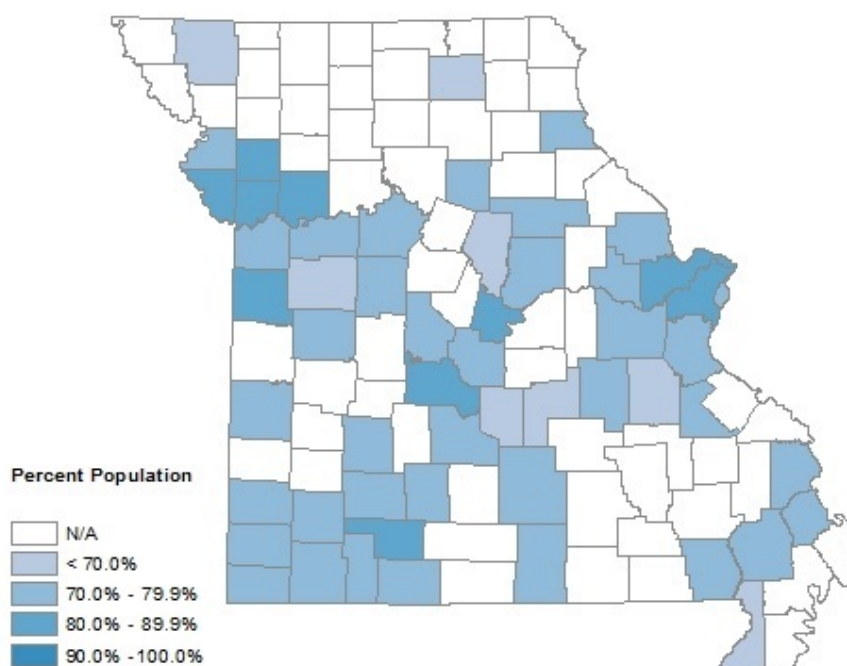


Figure 4.8: Estimated highest educational attainment level, by sex and race/ethnicity, Missouri, 2014

Sex	Race/Ethnicity	Highest Educational Attainment Level			
		Less than high school diploma	High school graduate, GED, or alternative	Some college or associate's degree	Bachelor's degree or higher
Male	Total	11.7%	32.9%	28.7%	26.8%
	White*	10.8%	32.9%	28.6%	27.8%
	Black	16.4%	36.7%	32.9%	14.0%
	Hispanic	28.1%	30.3%	23.1%	18.5%
Female	Total	10.6%	30.0%	31.2%	28.2%
	White*	9.9%	30.8%	30.5%	28.9%
	Black	13.1%	28.8%	38.1%	20.0%
	Hispanic	28.9%	21.0%	27.0%	23.2%

\*Includes persons of Hispanic origin

As discussed earlier in this section, a lack of health insurance is a barrier to health care, as provider visits, diagnostic testing, and treatment are expensive. Most who do not have health insurance are not able to afford basic health care, let alone any specialized services.

Estimates of the percentage of the population 18 to 64 years of age without health insurance ranged from 10.0% in St. Charles

County to 39.0% in Scotland County (Figure 4.9).<sup>11</sup>

Overall, an estimated 11.8% of Missourians less than 65 years of age lacked health insurance in 2014 (Figure 4.10). The percentage of the population that was uninsured varied by race/ethnicity. The percentage of was greatest among Hispanics (24.4%) and lowest among whites (10.4%).<sup>12</sup>

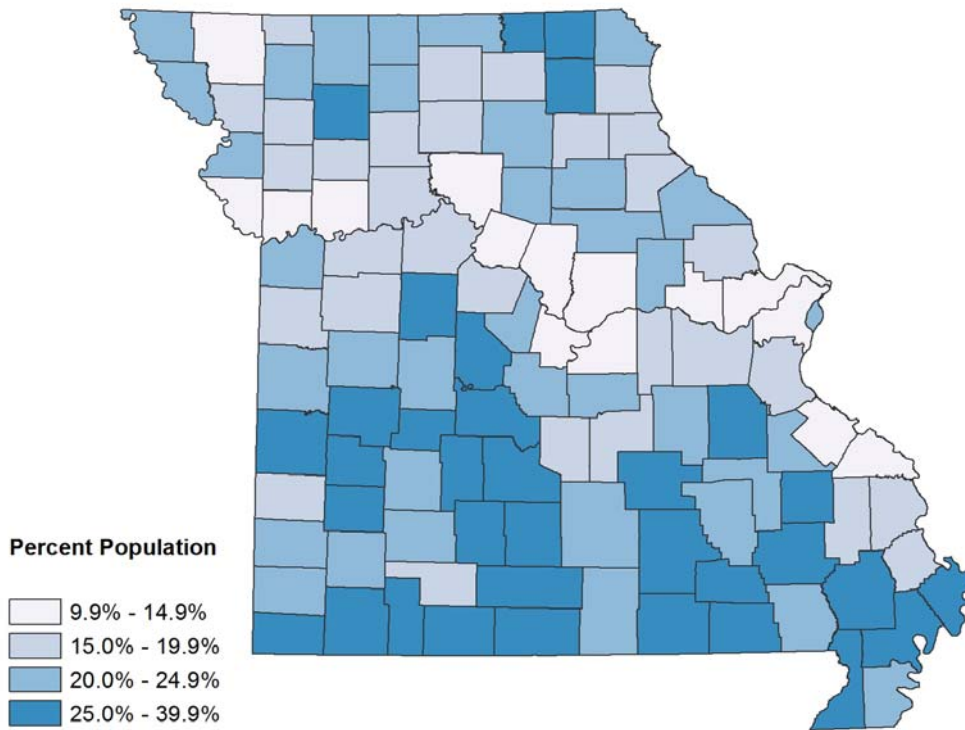
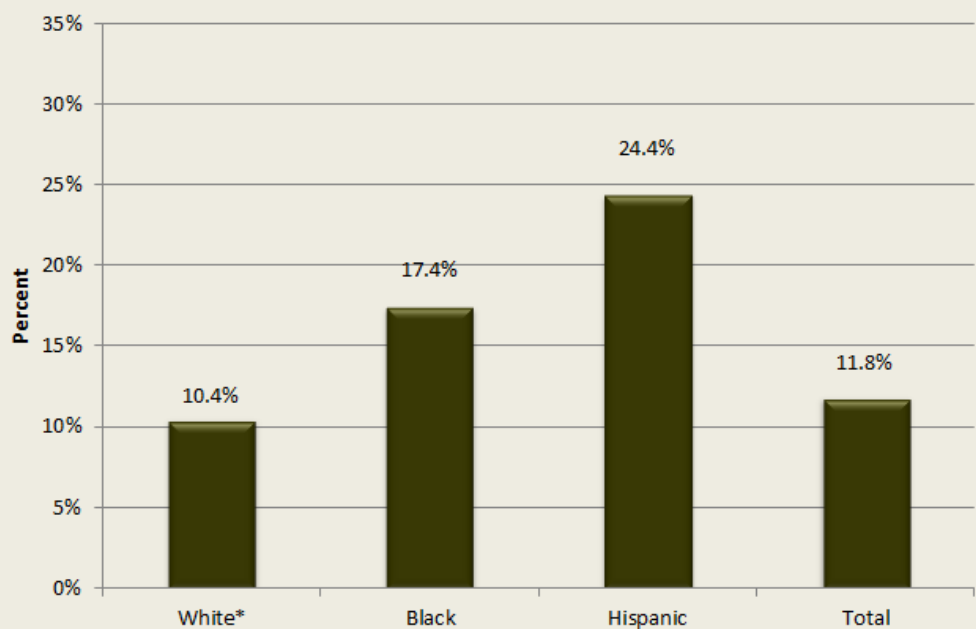


Figure 4.10: Estimated percent of population less than 65 years of age without health insurance, by race/ethnicity, Missouri, 2014



## Persons Under 30 Years of Age

Approximately 32% of persons who engage in IDU become positive for hepatitis C within one year and that percentage increases to 53% within five years.<sup>13</sup> Engaging in behaviors associated with IDU has become the primary risk factor for contracting hepatitis C.<sup>14</sup> CDC has reported a growing trend of hepatitis infection among those under the age of 30 years that is related to IDU behaviors.<sup>15</sup> The growing trend of IDU related to opioid and heroin use is discussed later in this report; this section focuses on reported chronic hepatitis C cases in those under 30 years of age in Missouri. In 2015, of the 7,795 chronic hepatitis C cases reported in Missouri 1,520, or 19.5%, were diagnosed in person under 30 years of age.

### Age

Persons between 25 and 29 years old accounted for 57.0% of the chronic hepatitis C cases reported in those under 30 years of age and 11.1% of all chronic hepatitis C cases reported in Missouri. Those aged 20 to 24 years accounted for the next highest percentage of chronic hepatitis C cases reported in persons younger than 30, at 36.8% (Figure 4.11).

Figure 4.11: Chronic hepatitis C cases for those under 30 years of age, by age, Missouri, 2015

Age	Count	Percent
0-4	12	0.8
5-9	1	0.1
10-14	2	0.1
15-19	78	5.1
20-24	560	36.8
25-29	867	57.0
<b>Total</b>	<b>1,520</b>	<b>100.0</b>

### Sex

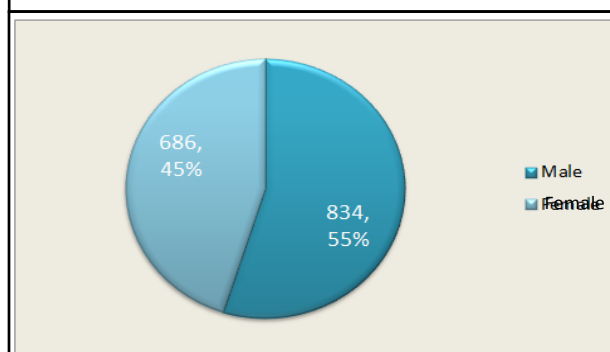
Females comprised 45.0% of the chronic hepatitis C cases in those under the age of 30 in 2015. This increase among young females may be significant, as it could show a change in infection patterns. Females overall have consistently accounted for approximately 37% of all reported cases of chronic hepatitis C in Missouri over the last 5 years. Males accounted for 834 of the 1,520 cases of chronic hepatitis C in those under 30 years of age in 2015 and are 1.2 times more likely than females to be infected (Figure 4.12).

### Race

As discussed in Section 3: Hepatitis C Surveillance, racial information is limited among reported chronic hepatitis C cases in Missouri. For those under 30 years of age, 24.0% had an unknown race. This is a much lower percentage of unknown race information than for all age groups. This decrease in missing demographic information may be due in part to Missouri's integrated systems that allow for importing of this information from birth certificates for those born in Missouri after 1982.

Whites accounted for the largest percentage of cases reported in those under 30 years of age, at 65.0%.

Figure 4.12: Chronic hepatitis C cases for those under 30 years of age, by sex, Missouri, 2015





## Baby Boomers

The national prevalence of hepatitis C among Baby Boomers (persons born between the years 1945 and 1965) is five times higher than the prevalence of hepatitis C among other groups.<sup>16</sup> In a 2012 report, CDC estimated that Baby Boomers accounted for approximately 75% of all hepatitis C-infected individuals. CDC and the U.S. Preventive Services Task Force recommend that all persons born between 1945 and 1965 be tested for hepatitis C infection.<sup>17</sup>

Baby Boomers are now being diagnosed with chronic hepatitis C and associated complications such as liver cirrhosis and liver cancer. Therefore, hepatitis C screening for those in the Baby Boomer generation is important to promote clinical interventions before the occurrence of late stages of disease, which are difficult and costly to treat and decrease life expectancy.<sup>18</sup>

In 2015, Missouri had 3,354 newly reported cases of chronic hepatitis C in persons designated as Baby Boomers.

Approximately 70% of the hepatitis C cases among the Baby Boomers were among males (Figure 4.13). Only 12.5% of newly reported cases of chronic hepatitis C in persons designated as Baby Boomers were among persons over 65 years of age. The number of cases among whites was 2.2 times higher than the number of cases among blacks (Figure 4.14).

The Southeast Planning Region accounted for 1,267 (37.7%) of newly reported Baby Boomer hepatitis C cases, as shown in Figure 4.15. Hepatitis C infections increased approximately 19% from 2011 to 2015, as shown in the five-year trend in Figure 4.16.

Figure 4.13: Chronic hepatitis C cases diagnosed in persons born between 1945 and 1965, by sex, Missouri, 2015

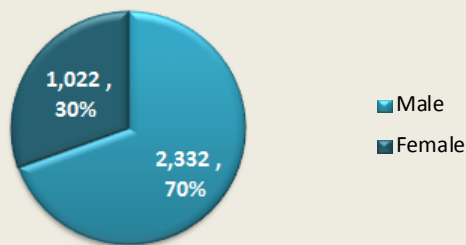


Figure 4.14: Chronic hepatitis C cases diagnosed in persons born between 1945 and 1965, by race, Missouri, 2015

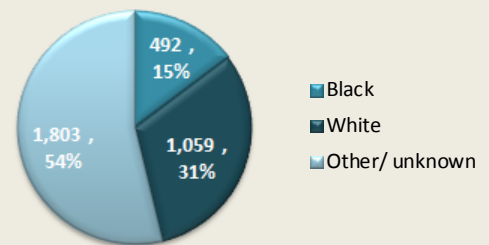


Figure 4.15: Chronic hepatitis C cases diagnosed in persons born between 1945 and 1965, by planning region, Missouri, 2015

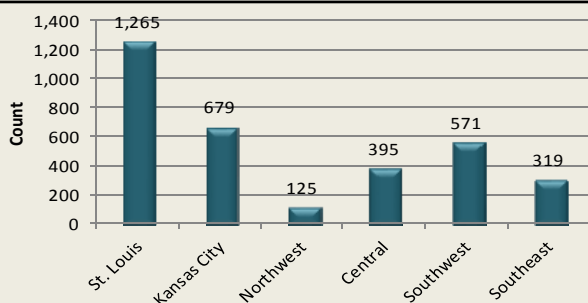
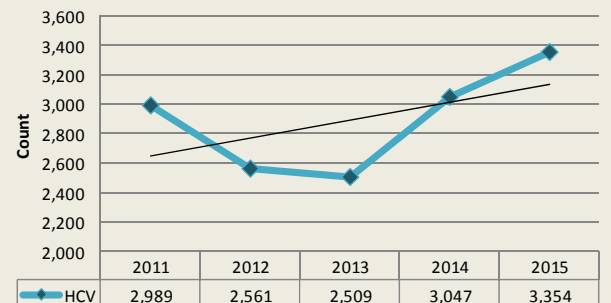


Figure 4.16: Chronic hepatitis C cases diagnosed in persons born between 1945 and 1965, Missouri, 2011-2015



## Risk Factors

According to the Council of State and Territorial Epidemiologists (CSTE), risk factors for hepatitis C infection include: receiving a blood transfusion, an organ transplant, or a tissue transplant prior to 1992; receiving clotting factor concentrates prior to 1987; receiving long-term dialysis; using non-prescription or street drugs; having direct contact with someone else's blood; having direct contact with someone diagnosed with hepatitis C; receiving a tattoo or body piercing; receiving treatment for an STD; having surgery; and receiving injection medications at a doctor's office or as part of a medical procedure.<sup>19</sup> These risk factors can be collected in WebSurv for each case of hepatitis C that is reported, but as no investigation is typically completed on hepatitis C infections, this information is rarely known. Only 1.6% of all hepatitis C cases reported in Missouri in 2015 had risk factor information reported. Due to the extremely limited data, it is difficult to derive any meaningful conclusions regarding risk factors among persons diagnosed with hepatitis C in Missouri.

Opioids and Injection Drug Use

With IDU now the number one risk factor for contracting hepatitis C, it is becoming increasingly important to review available information on opioid use and IDU.<sup>20</sup> Opioid abuse is a growing problem in Missouri that is reflected in multiple datasets.

Inpatient hospitalization and ER data collected through the Patient Abstract System (PAS) reveal that from 2001 to 2014 (the most recent year of PAS data currently available), inpatient hospitalization visits for opioid overdoses more than doubled, from 5,329 visits to 11,009 visits. ER visits increased by an even greater amount, with counts more than 3.5 times higher in 2014 (7,779) than in 2001 (2,177) (Figure 4.17). The 7,779 opioid overdose ER visits by Missouri residents in 2014 was the highest count since the PAS dataset began collection in 1994. The total initial cost of opioid-involved emergency room visits (before insurance negotiations, write-offs, etc.) was \$95,315,137 for the 2010 to 2014 time period.

Heroin as a percentage of all opioid-related ER visits increased steadily over the past 14 years. In 2001, heroin accounted for only 4.3% of all opioid-related ER cases, but that figure had increased to 16.1% by 2014.

Demographic analysis reveals that heroin ER visit rates are highest among males, blacks, and younger adults (Figure 4.18). However, heroin rate increases are highest for whites among both genders and the 25 to 34 age group. Injecting heroin instead of sniffing, snorting, or smoking it provides a faster and stronger high.<sup>21</sup> Heroin users who inject the drug are thus at risk of contracting viral hepatitis.

(Records were included in these calculations based upon the first five diagnosis codes on the patient record. In the Missouri PAS, up to 23 diagnosis fields are available; therefore, the numbers presented here would be higher if all diagnosis codes had been included.)

Figure 4.17: PAS ER visits for heroin versus other opioid diagnoses, Missouri, 2001-2014

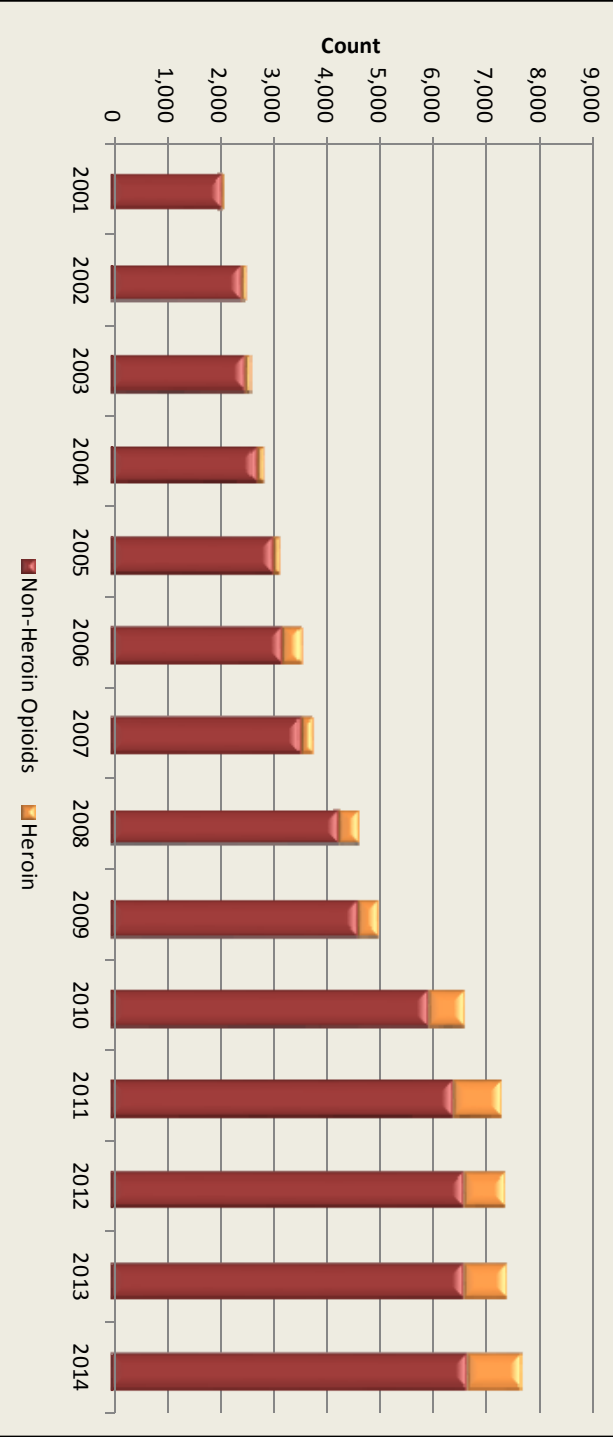


Figure 4.18: PAS ER visits for heroin, by race and sex, and by age, Missouri, 2001-2007 vs. 2008-2014

Race/Gender	2008-2014 Rate per 100,000 Population		2001-2007 vs. 2008-2014 Percent Increase		Age	2008-2014 Rate per 100,000 Population		2001-2007 vs. 2008-2014 Percent Increase	
White Male		15.1		414%	18-24		35.3		347%
White Female		6.6		346%	25-34		34.9		422%
Black Male		25.6		120%	35-44		12.4		318%
Black Female		7.9		225%	45-54		6.9		129%
					55-64		3.7		375%

PAS data also reveal that the number of infants experiencing neonatal abstinence syndrome (NAS) at birth is increasing. (These cases may not reflect only opioid drug use.) From 2010 through 2014, the number of NAS hospital discharges increased by over 67%, from 419 in 2010 to 702 in 2014 (Figure 4.19). If the mothers of these infants are IDU, these infants may also be at greater risk of contracting blood-borne diseases such as hepatitis.

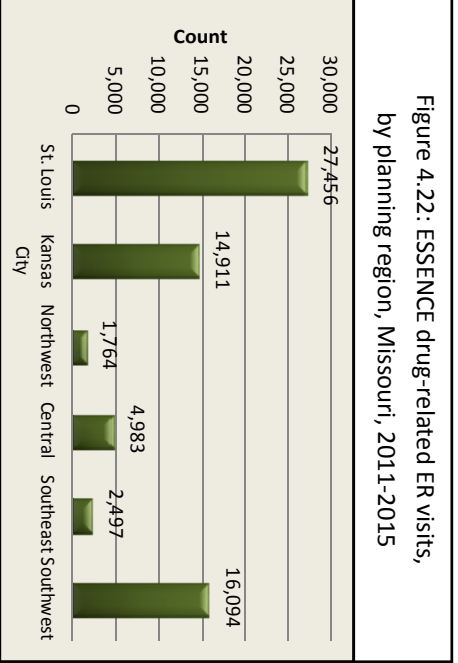
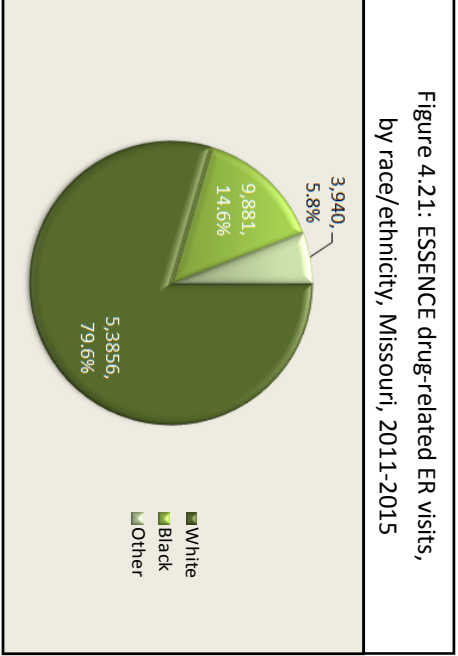
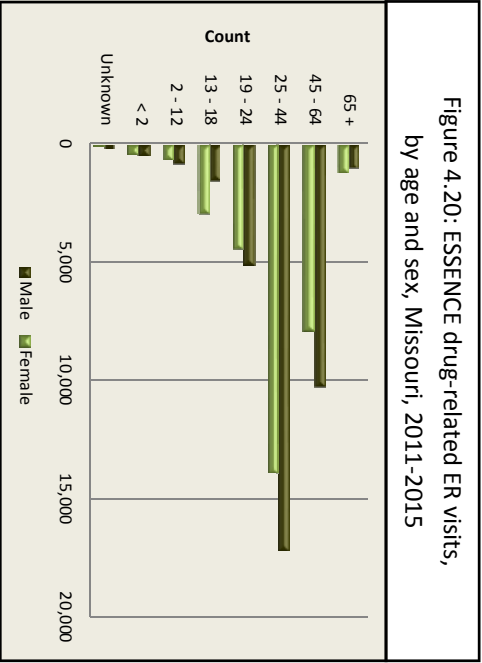
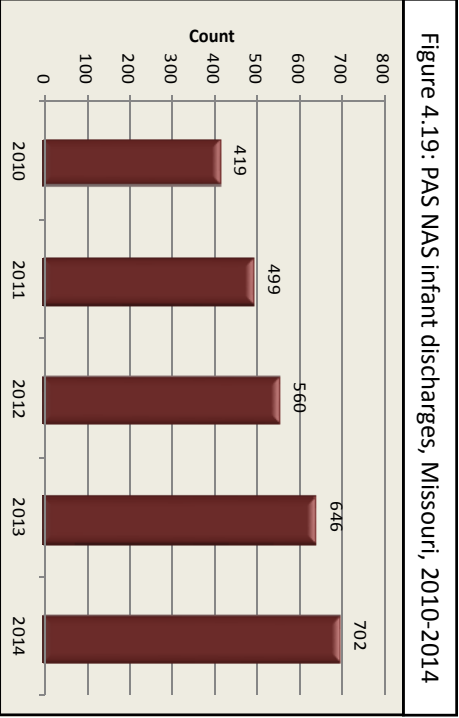
At the time of publication of this report, CSTE is considering a position statement regarding the establishment of a national case definition for perinatal hepatitis C infection. Creating a national standard and adding perinatal hepatitis C infection to the NNDL would assist in identifying the actual impact of perinatal hepatitis C in the U.S.<sup>22</sup>

Another system used to track drug-related ER visits is ESSENCE. While PAS collects final diagnosis information, ESSENCE collects near real-time data on ER patients' chief complaints for the purpose of syndromic surveillance. An ESSENCE query was created to capture all drug-related chief complaints in Missouri from 2011 through 2015. ER visits to Missouri hospitals by non-Missouri residents are not included in the following

information. Drug-related ER visits were most commonly made by adults aged 25 to 44 years. Numbers gradually increased across younger age groups, peaked among this age group (25 to 44 years), and declined across older age groups. Among most age groups, the number of drug-related ER visits for males was higher than the number for females, but among age groups 13 to 18 years and 65 years and older, the numbers of drug-related ER visits for males were lower than the numbers for females (Figure 4.20).

Among all drug-related ER visits reported in ESSENCE from 2011 through 2015, 79.6% were for white patients, 14.6% were for black patients and 5.8% were for other race patients (Figure 4.21).

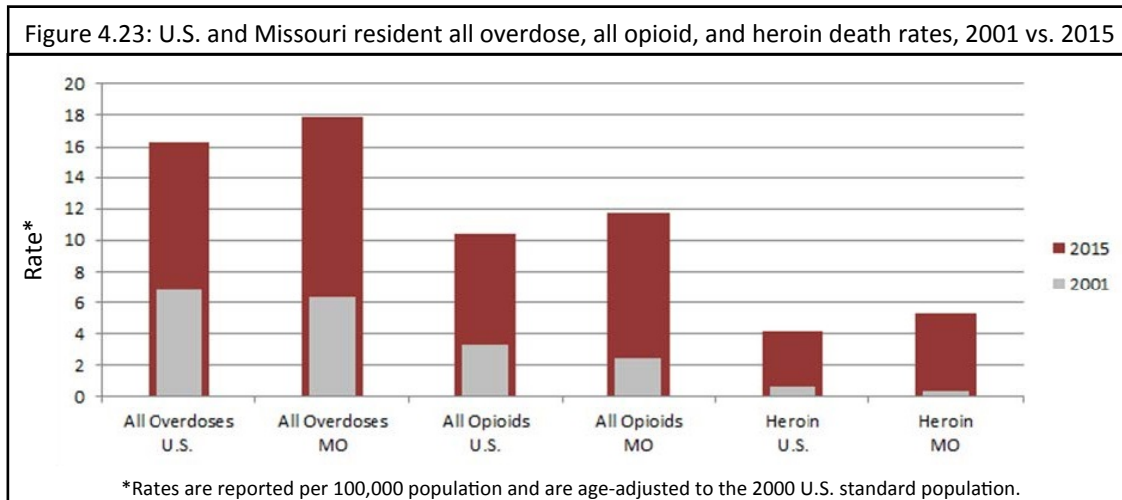
Of the six planning regions in Missouri, the St. Louis Planning Region reported the most drug-related ER visits (27,456) from 2011 to 2015. The three regions which account for the largest number of drug-related ER visits are the Kansas City, Southwest, and St. Louis Planning Regions (Figure 4.22). At least 353 drug-related ER visits were reported each year in the Northwest Planning Region.



Increases in opioid abuse are also evident in Missouri resident death data. Opioid deaths are believed to be underreported on death certificates, so it is necessary to look at the total drug overdose death rate to capture the full effect of opioids. The following rates are based on these underlying cause of death International Classification of Diseases 10<sup>th</sup> Revision (ICD-10) codes: X40-44 (accidental), X60-64 (intentional self-poisoning), X85 (assault), or Y10-Y14 (undetermined intent). From 2001 to 2015, the overdose death rate for Missouri residents increased by an order of nearly 3, from an age adjusted rate of 6.3 per 100,000 to 17.9 in 2015. The 2015 Missouri rate is higher than the U.S. rate of 16.3.<sup>23</sup>

Opioid-specific death rates per 100,000 are also higher in Missouri than in the nation overall, at 11.7 in Missouri compared to 10.4 for the nation overall. Opioid-specific death rates are based on the same ICD-10 codes utilized in the

overdose definition but with ICD-10 codes T40.0 (opium), T40.1 (heroin), T40.2 (other opioids), T40.3 (methadone), T40.4 (other synthetic narcotics), or T40.6 (other and unspecified narcotics) indicated in the multiple cause of death codes. Between 2001 and 2015, the opioid death rate in Missouri increased by nearly five times, from 2.4 to 11.7. Overdose deaths due to heroin have grown even faster. From 2001 to 2015, the Missouri heroin death rate grew from 0.4 to 5.3, a more than 13-fold increase, and was almost 30% higher than the U.S. rate (Figure 4.23).<sup>24</sup> Heroin also now causes a larger share of opioid deaths. In 2001, heroin deaths accounted for 18.2% of all opioid deaths, but by 2015 the share was nearly half (43.7%). (Heroin death rates are based on the same ICD-10 codes utilized in the overdose definition but with ICD-code T40.1 indicated in the multiple cause of death codes.)



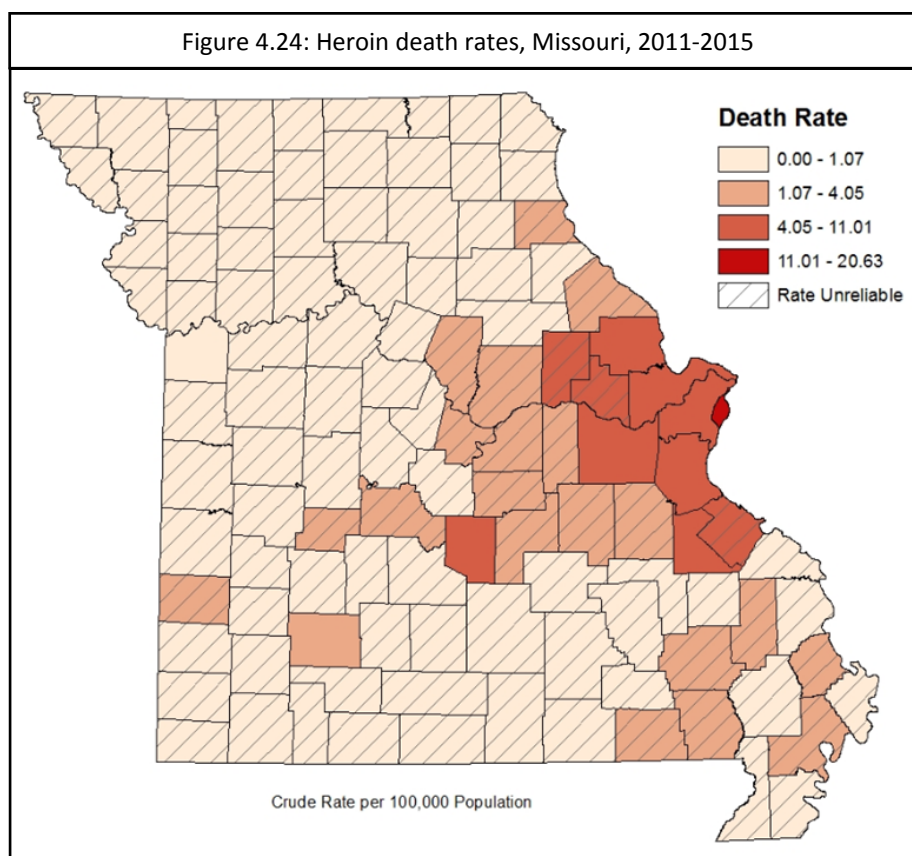
Geographic analysis of death data reveals a significant pattern. Heroin-specific death rates are extremely focused in the St. Louis metropolitan area (Figure 4.24). All but one Missouri county with a heroin death rate above 4.0 was either located in the St. Louis metropolitan area or was contiguous to it. Some additional ZIP code-specific data demonstrate that large swaths of the greater St. Louis area have rates above 9.9.

Several efforts are underway that will better address the opioid epidemic in the state. When the creation of this profile began, Missouri was the only state without a statewide prescription drug monitoring program (PDMP). However, on July 17, 2017, Governor Eric Greitens issued Executive Order 17-18, which tasked DHSS with the creation of a statewide PDMP “to analyze prescriber and pharmacy prescription and dispensing data for schedule II-IV controlled substances, which includes opioids.”<sup>25</sup> Prior to the issuance of Executive Order 17-18, St. Louis County partnered with several other jurisdictions within the state to create their own PDMP which allows prescribers to access patient controlled substance data submitted by dispensers. As of August 1, 2017, jurisdictions that had implemented the St. Louis County PDMP included: Audrain County, Bates County, Benton County, Bollinger County, Boone County, the City of Columbia, the City of Independence, the City of Nevada, Cole County, Cooper County, Gasconade County, Jackson County, Jefferson City, Jefferson County,

Johnson County, Kansas City, Lincoln County, Madison County, Miller County, Mississippi County, New Madrid County, Osage County, Pemiscot County, Perry County, Pettis County, Saline County, St. Charles County, St. Louis County, St. Louis City, Ste. Genevieve County, Stoddard County, and Vernon County. Butler County, the City of Linn (Osage County), and St. Francois County were slated to implement the St. Louis County PDMP on September 1, 2017.<sup>26</sup>

DHSS is also looking for ways to better track opioid and other overdoses. The Enhanced State Surveillance of Opioid-Involved Morbidity and Mortality grant from the CDC was recently awarded to BHCADD. The main goals of this grant are to improve the timeliness of fatal and nonfatal opioid overdose surveillance, including overdoses related to opioid pain relievers and heroin. Surveillance findings from this grant will be shared with key stakeholders working to prevent or respond to opioid overdoses. The Bureau of Vital Statistics and BRDI are also assisting with this grant, and the three units are collaborating to provide improved surveillance of both opioid use and hepatitis.

Note: All death rates in this section that are not identified as a percent are reported per 100,000 population and are age-adjusted (where applicable) to the 2000 U.S. standard population.





## Vulnerable Region: Southeast Planning Region

In 2014 and 2015, an HIV outbreak occurred in the rural area of Scott County, Indiana. The outbreak was attributed to IDU and unsterile needle sharing. Among the nearly 200 HIV cases reported as a result of the outbreak, over 90% were co-infected with hepatitis C. In response, CDC conducted an analysis of counties throughout the U.S. with similar geographic and sociodemographic characteristics to Scott County, Indiana. Specific indicators CDC used for comparison included, but were not limited to: drug overdose deaths, insurance coverage, education, poverty, race/ethnicity, and unemployment. In June 2016, CDC released the findings in the publication, *County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States* in the *JAIDS*.<sup>27</sup> In the study, 220 counties across 26 states were identified as vulnerable to an outbreak of HIV and/or hepatitis C among PWID. Missouri contains 13 of the 220 identified counties. The findings from the analysis only point to potential vulnerability; therefore, counties with characteristics similar to the identified counties may be potentially vulnerable as well. Eight of the 13 identified counties in Missouri are located in the Southeast Planning Region, a region which consists of 20 counties. Figure 4.25 shows the location of the Southeast Planning Region in the

state of Missouri. The following section will focus on the challenges faced by the Southeast Planning Region that could indicate vulnerability to an increase in hepatitis C infections.

## Population

The Southeast Planning Region's total population in 2014 was 499,359 persons, which accounted for only 8.2% of Missouri's total population.<sup>28</sup> The Southeast Planning Region is primarily rural, with 14 of the 20 counties (70.0%) considered to be non-metropolitan areas according to the U.S. Census Bureau.<sup>29</sup> The population was equally distributed between the sexes, with 49.7% of the population being male and 50.3% being female. Whites represented the largest proportion of the Southeast Planning Region's population (89.1%), followed by blacks (6.4%), as shown in Figure 4.26. This differs slightly from the distribution of race among the state's overall population. Whites accounted for 80.1% of Missouri's overall population in 2014, and blacks accounted for 11.6%.<sup>30</sup>

Figure 4.25: Southeast Planning Region map

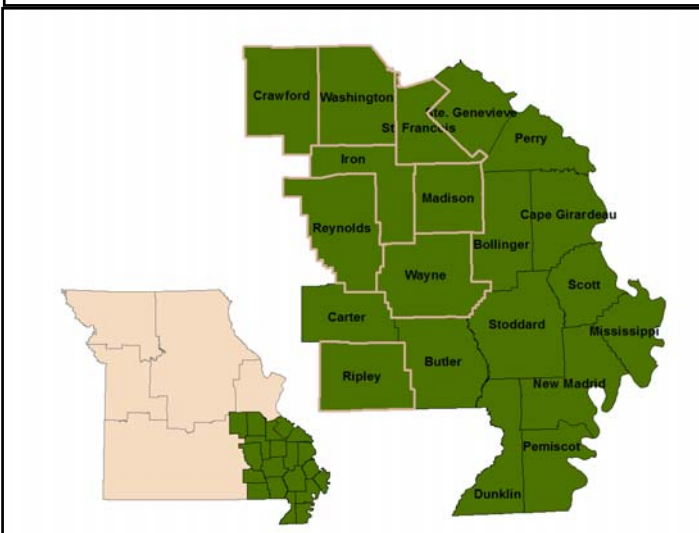


Figure 4.26: Southeast Planning Region population estimates, Missouri, 2014

County	White	Black	Other	Total
Bollinger County	12,000 96.8%	50 0.4%	344 2.8%	12,394
Butler County	38,388 89.3%	2,320 5.4%	2,264 5.3%	42,972
Cape Girardeau County	67,610 86.6%	5,922 7.6%	4,511 5.8%	78,043
Carter County	5,938 94.9%	24 0.4%	296 4.7%	6,258
Crawford County	23,620 95.8%	109 0.4%	921 3.7%	24,650
Dunklin County	25,458 81.2%	3,205 10.2%	2,681 8.6%	31,344
Iron County	9,673 94.2%	158 1.5%	436 4.2%	10,267
Madison County	11,785 95.3%	52 0.4%	531 4.3%	12,368
Mississippi County	10,235 71.9%	3,487 24.5%	510 3.6%	14,232
New Madrid County	14,687 80.4%	2,857 15.6%	728 4.0%	18,272
Pemiscot County	12,226 69.3%	4,667 26.4%	757 4.3%	17,650
Perry County	18,342 95.5%	99 0.5%	761 4.0%	19,202
Reynolds County	6,212 94.6%	56 0.9%	297 4.5%	6,565
Ripley County	13,327 95.4%	94 0.7%	548 3.9%	13,969
Scott County	32,646 83.9%	4,504 11.6%	1,753 4.5%	38,903
St. Francois County	60,873 92.3%	2,947 4.5%	2,140 3.2%	65,960
Ste. Genevieve County	17,069 95.3%	152 0.8%	693 3.9%	17,914
Stoddard County	28,543 95.6%	346 1.2%	978 3.3%	29,867
Washington County	23,671 94.4%	605 2.4%	801 3.2%	25,077
Wayne County	12,865 95.6%	83 0.6%	504 3.7%	13,452
Region Total	445,168 89.1%	31,737 6.4%	22,454 4.5%	499,359

No significant differences existed in the distribution of age groups between the region's population and the state's overall population. Persons 45 to 64 years of age accounted for 26.9% of the region's 2014 population, persons 25 to 44 years of age accounted for 24.0%, and persons 13 to 24 years of age accounted for 15.7%. Figure 4.27 shows the distribution of age groups among the region's 2014 population.<sup>31</sup>

According to the 2011 to 2015 ACS conducted by the U.S. Census Bureau, 78.9% of persons ages 25 and older in the Southeast Planning Region had attained at least a high school diploma or equivalent. This is lower than the estimated percentage for the state overall. An estimated 85.0% of Missourians ages 25 and older had completed at least high school or equivalent. The ten counties in Missouri with the lowest percentages of educational attainment for the 2011 to 2015 time period were in the Southeast Planning Region. Dunklin County at 73.0% had the lowest percentage in the region and the state of persons with at least a high school diploma or equivalent. In other words 27%, or more than one-

fourth, of Dunklin County residents ages 25 and older lacked a high school diploma or equivalent. Cape Girardeau had the highest rate in the region with 89.1%. Figure 4.28 shows the distribution of the percentage of persons ages 25 years and older with a high school diploma or equivalent in the Southeast Planning Region.<sup>32</sup>

According to the U.S. Census Bureau, from 2011 to 2013, an estimated 23.0% of persons younger than 65 years old in the Southeast Planning Region were uninsured. This is higher than the 13.6% estimate for the state overall. Only 1 of the 20 counties in the region (Ste. Genevieve County) had a percentage lower than the overall state percentage of persons who were uninsured. Figure 4.29 shows the distribution of the percentage of persons younger than 65 with no insurance in the Southeast Planning Region from 2011 to 2013.<sup>33</sup>

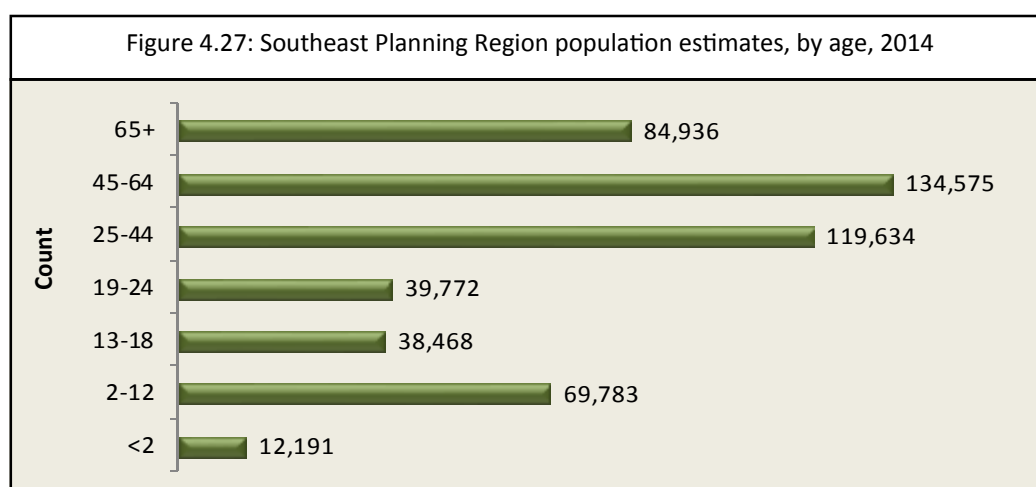


Figure 4.28: Persons aged 25 years and older with a high school diploma or equivalent, Southeast Planning Region, Missouri, 2011-2015

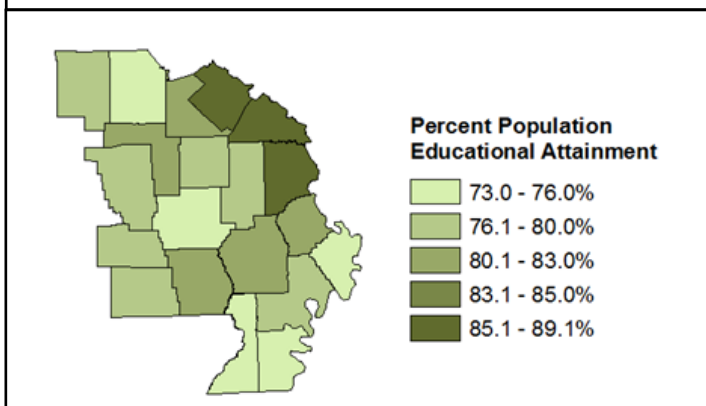
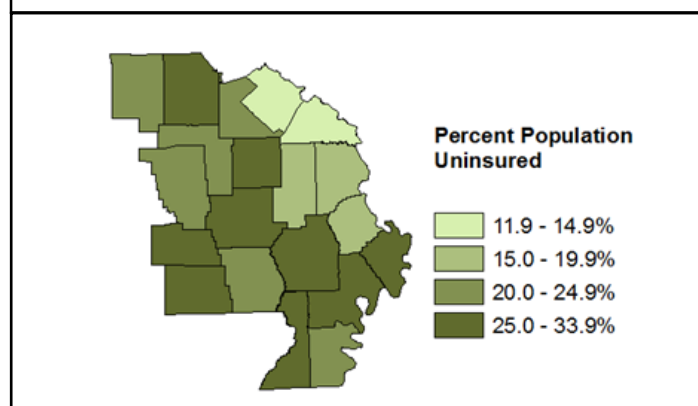


Figure 4.29: Persons younger than 65 years old who are uninsured, Southeast Planning Region, Missouri, 2011-2013





Per the U.S. Census Bureau, counties with the highest percentages of poverty in Missouri are concentrated in the Southeast Planning Region. From 2009 to 2013, the percentage of persons living in poverty in the region was 21.0%. This was higher than the 15.5% estimated percentage of persons living in poverty for the state overall. Pemiscot County had the highest percentage of persons living in poverty (29.3%) in the entire state. Figure 4.30 shows the distribution of the percentages of persons living in poverty in the Southeast Planning Region from 2009 to 2013.<sup>34</sup>

### Hepatitis C

Of the 7,803 Missouri hepatitis C cases reported in 2015, 1,013 cases (13.0%) were reported in the Southeast Planning Region. Figure 4.31 shows the increase in cases reported in the Southeast Planning Region from 2011 to 2015. A gradual increase was seen in cases reported between 2011 and 2013, and then a 27.0% increase occurred from 2013 to 2014. A

sharp 30.5% increase occurred in reported cases from 2014 to 2015. This increase is higher than the 24.2% increase observed in the state overall.

Hepatitis C infection was reported at a rate of 202.9 persons per 100,000 population in the Southeast Planning Region in 2015. Rates ranged from 48.4 in Bollinger County to 698.9 in St. Francois County. St. Francois County had the second highest rate of reported hepatitis C cases in the state of Missouri in 2015. Rates are considered unreliable in 10 of the 20 counties due to the low number of cases reported (fewer than 20 per county). Figure 4.32 shows the distribution of rates of reported hepatitis C cases in the Southeast Planning Region in 2015.

Figure 4.30: Persons living in poverty, Southeast Planning Region, Missouri, 2009-2013

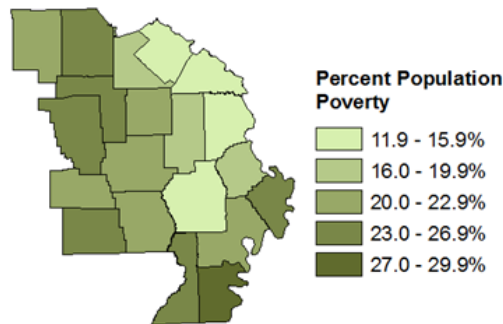


Figure 4.31: Reported hepatitis C cases, Southeast Planning Region, Missouri, 2011-2015

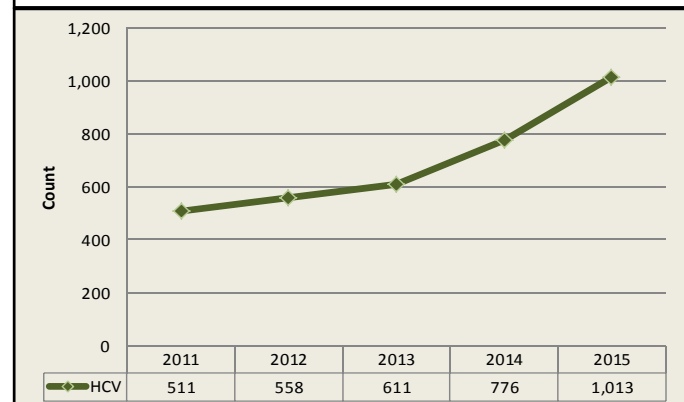
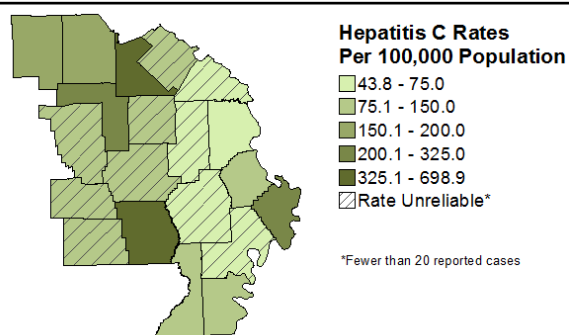


Figure 4.32: Hepatitis C rates per 100,000 population, Southeast Planning Region, Missouri, 2015



Of the 1,013 hepatitis C cases reported in the Southeast Planning Region in 2015, 70.9% were males and 29.1% were females. As previously discussed, reporting of race information is limited for hepatitis C cases. Nearly 39.0% of the reported cases in the region did not include race information. Of the reported cases, including those with no race information, 52.4% were whites and 8.2% were blacks.

Differences exist in the distribution of reported cases by age at diagnosis between the Southeast Planning Region and Missouri overall. Figure 4.33 shows the distribution of reported cases by age group at diagnosis. In the Southeast Planning Region, the largest proportion of reported hepatitis C cases (51.2%) was among persons 25 to 44 years of age, followed by persons aged 45 to 64 (34.6%). For Missouri overall, 45.7% of reported hepatitis C cases in 2015 were among persons aged 45 to 64,

followed by 38.2% among persons aged 25 to 44.

Figure 4.34 depicts the 2015 distribution of age at diagnosis by sex for hepatitis C cases reported in the Southeast Planning Region. The largest number of cases (373) was reported among males ages 25 to 44 (36.8% of the total reported cases), followed by males ages 45 to 64 with 259 cases (25.6%), and then females ages 25 to 44 with 146 cases (14.4%).

Figure 4.33: Reported hepatitis C cases, by age at diagnosis, Southeast Planning Region, Missouri, 2015

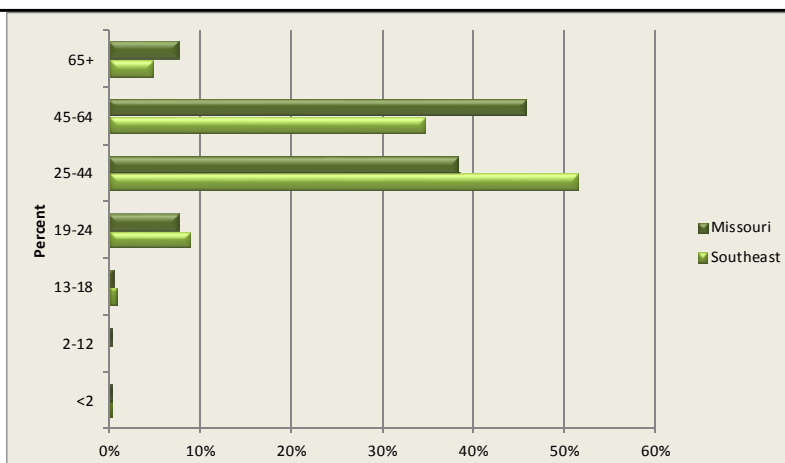
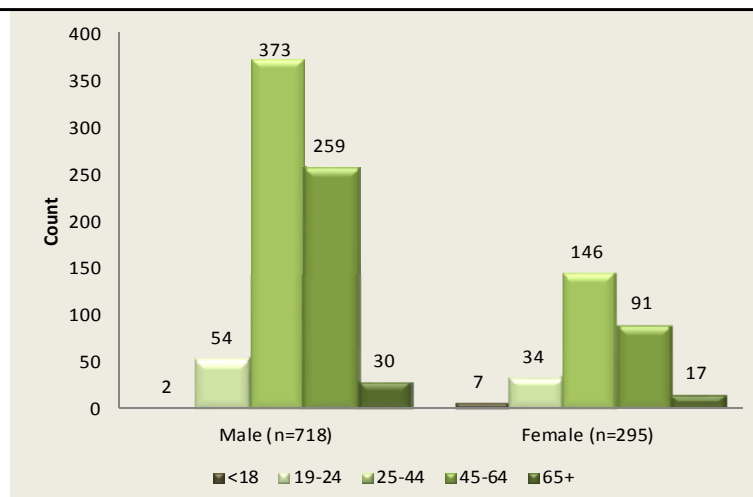


Figure 4.34: Reported hepatitis C cases, by age at diagnosis and sex, Southeast Planning Region, Missouri, 2015



## Risk Factors

According to the vulnerability assessment conducted by CDC, evidence of IDU was a criterion used to identify counties vulnerable to a hepatitis C outbreak. While there are limited data available to identify the extent of IDU, one indicator is the number of deaths in which opioid or heroin overdose is listed as a contributing factor on the death certificate. Due to constraints which make it difficult to identify deaths caused by an overdose (e.g., lag time between death and toxicology results or the costs associated with conducting posthumous toxicology tests), it is likely that overdose deaths are underreported. However, efforts are being made in Missouri and nationally to better identify overdose deaths as well as the specific drug involved.

From 2011 to 2015, there were 186 deaths with a contributing factor of non-heroin opioid overdose listed on the death certificate. St. Francois County had the highest rate of non-heroin opioid overdose deaths in the Southeast Planning Region, with 17.3 persons per 100,000 population, followed by Ste. Genevieve County, with 15.6 persons per 100,000 population. From 2011 to 2015, 51 deaths occurred in the Southeast Planning Region with a contributing factor of heroin overdose listed on the death certificate. Both St. Francois County and Ste. Genevieve County also had the highest rates of heroin overdose deaths with 6.7 persons per 100,000

population. Figure 4.35 shows the distribution of rates of non-heroin opioid overdose deaths and heroin overdose deaths from 2011 to 2015 in the Southeast Planning Region.<sup>35</sup>

## Morbidity

In 2014, the latest year of hospital data available, there were 3,546 inpatient hospitalizations in the Southeast Planning Region due to issues related to hepatitis C. This includes hospitalization records including a diagnosis code of acute, chronic, or unspecified hepatitis C. St. Francois County had the highest rate of hospitalizations, with 3,309.6 per 100,000 population, followed by Ste. Genevieve County, with 1,669.1 per 100,000 population. There was a 14.6% increase in the number of hepatitis C-related hospitalizations in the Southeast Planning Region from 2010 to 2014. In 2014, there were also 1,647 ER visits in the Southeast Planning Region due to issues related to hepatitis C. This includes any discharge record including a diagnosis code of acute, chronic, or unspecified hepatitis C. Ste. Genevieve County had the highest rate of hepatitis C-related ER visits, with 1,484.9 visits per 100,000 population, followed by St. Francois County with 1,470.6. There was a 43.4% increase in the number of hepatitis C-related ER visits in the Southeast Planning Region from 2010 to 2014. Figure 4.36 shows the distribution of rates of hepatitis C-related inpatient hospitalizations and ER visits, respectively, in the Southeast Planning Region in 2014.

Figure 4.35: Opioid overdose deaths, Southeast Planning Region, Missouri, 2011-2015

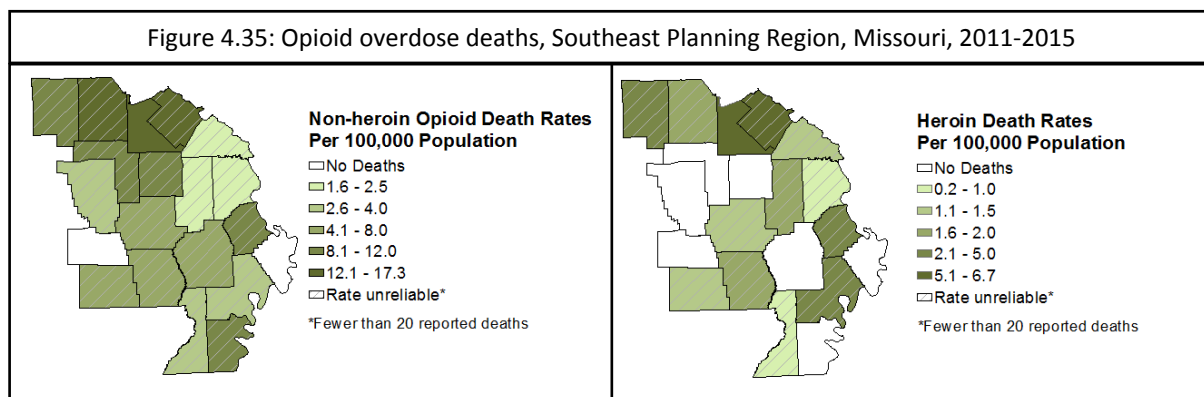
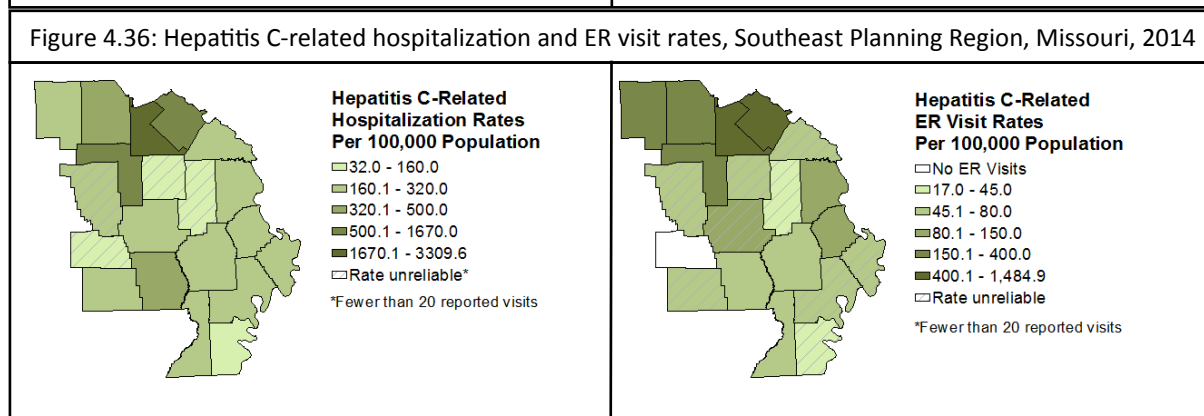


Figure 4.36: Hepatitis C-related hospitalization and ER visit rates, Southeast Planning Region, Missouri, 2014



According to CDC’s vulnerability assessment, over 90% of the HIV cases identified in the outbreak in Scott County, Indiana, were co-infected with hepatitis C.<sup>36</sup> Of the hepatitis C cases reported in the Southeast Planning Region in 2015, 17 cases (1.7%) were co-infected with HIV. The highest rate of HIV and hepatitis C co-infections was reported in Mississippi County, with 14.1 persons per 100,000 population, followed by St. Francois County with 12.1. Figure 4.37 shows the distribution of rates of persons diagnosed with hepatitis C in the Southeast Planning Region in 2015 who were co-infected with HIV.

### Mortality

In 2015, there were 25 deaths in the Southeast Planning Region with an underlying or contributing factor of hepatitis C listed on the death certificate. Iron County had the highest rate of hepatitis C-related deaths, with a rate of 30.0 persons per 100,000 population, followed by Ripley County with 14.3. Figure 4.38 shows the distribution of deaths in the Southeast Planning Region in 2015 with an underlying or contributing cause of hepatitis C listed on the death certificate.

Figure 4.37: HIV and hepatitis C co-infection rates, Southeast Planning Region, Missouri, 2015

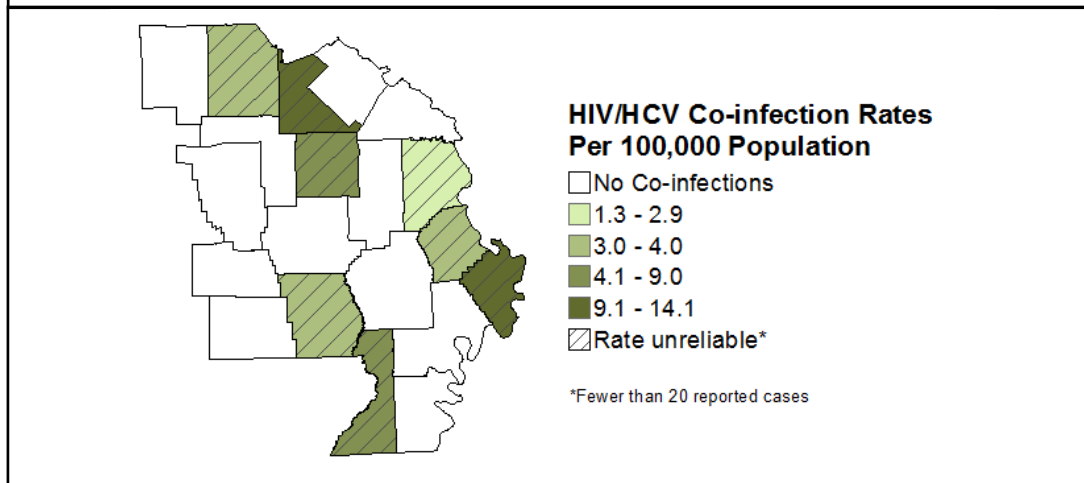
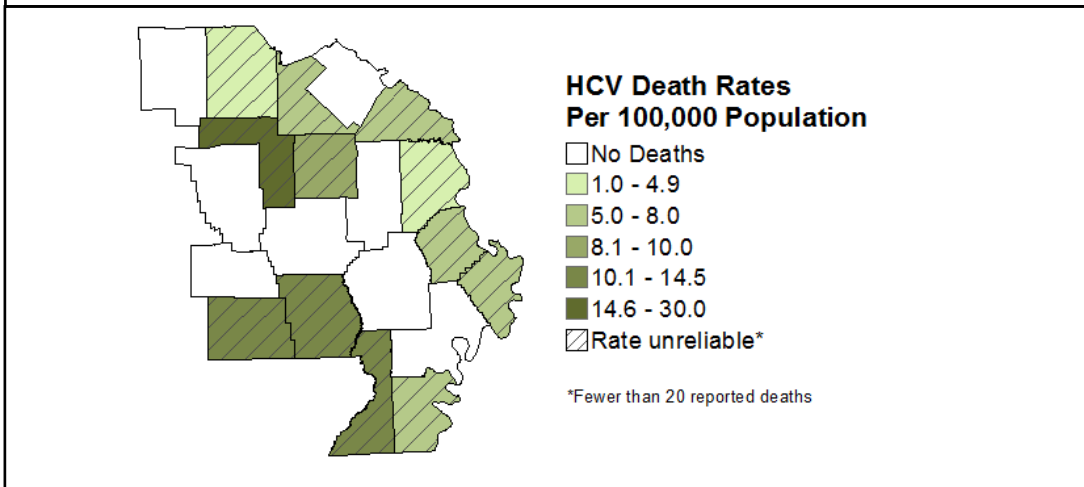


Figure 4.38: Hepatitis C-related death rates, Southeast Planning Region, Missouri, 2015



### Vulnerable Region: St. Louis Planning Region

The St. Louis Planning Region has a high proportion of reported hepatitis C cases compared to overall statewide cases. The challenges faced by the region include high percentages of persons who are uninsured or living in poverty and high rates of opioid- and heroin-related deaths. The St. Louis Planning Region is composed of six counties and the independent City of St. Louis (Figure 4.39).

### Population

The estimated population of the St. Louis Planning Region in 2014 was 2,111,090 (Figure 4.40), which accounted for approximately 35% of Missouri's total population. Persons 18 years of age and younger accounted for 24.0% (506,627) of the St. Louis Planning Region's population, and persons aged 65 or older accounted for 14.6% (309,273) of the population, as depicted in Figure 4.41. The distribution of sex in the region is nearly equal, with males making up 48.3% and females 51.8% of the overall population.<sup>37</sup>

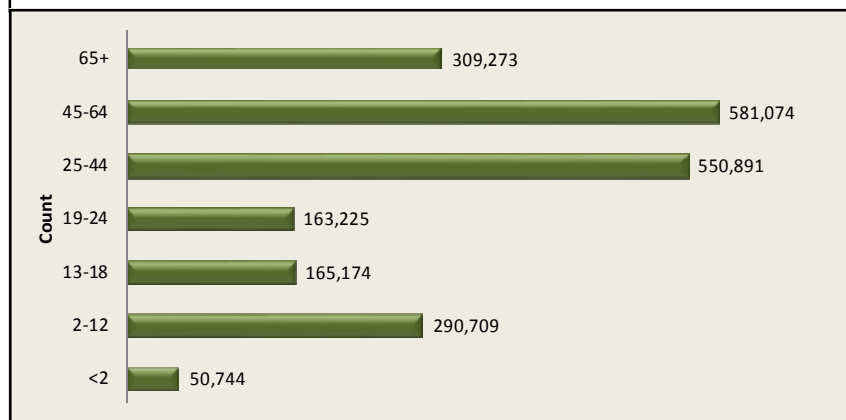
Figure 4.39: St. Louis Planning Region map



Figure 4.40: St. Louis Planning Region population estimates, Missouri, 2014

St. Louis Planning Region	
County	Pop Est
Franklin County	102,084
Jefferson County	222,716
Lincoln County	54,249
St. Charles County	379,493
St. Louis County	1,001,876
St. Louis City	317,419
Warren County	33,253
<b>Total</b>	<b>2,111,090</b>

Figure 4.41: St. Louis Planning Region population estimates, by age, Missouri, 2014



The St. Louis Planning Region population distribution by race differs from the overall population distribution of the state. Blacks accounted for 19.4% of the region's population, whites accounted for 72.9%, and 7.7% of the population reported another race or unknown race (Figure 4.42). For the state overall, the population was 11.6% black, 80.0% white, and 8.3% other or unknown race. For comparison, Figure 4.43 shows the population by race broken out by county.<sup>38</sup> The table reveals that these differences are largely attributable to higher percentages of black residents in St. Louis City (46.2%) and St. Louis County (23.7%).

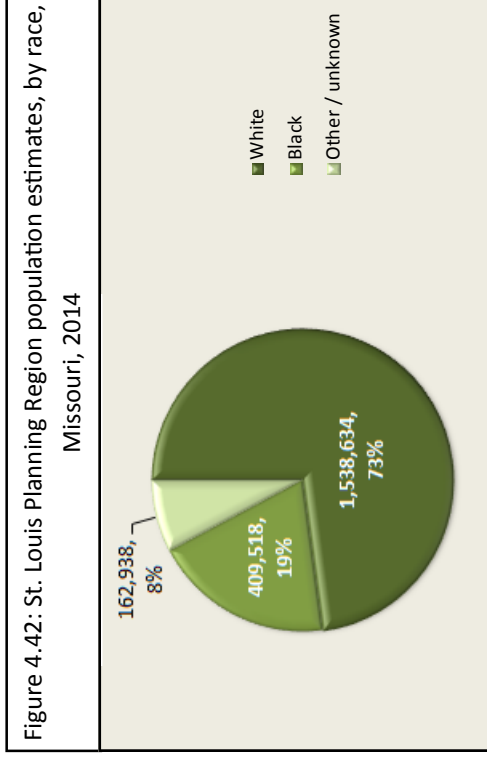


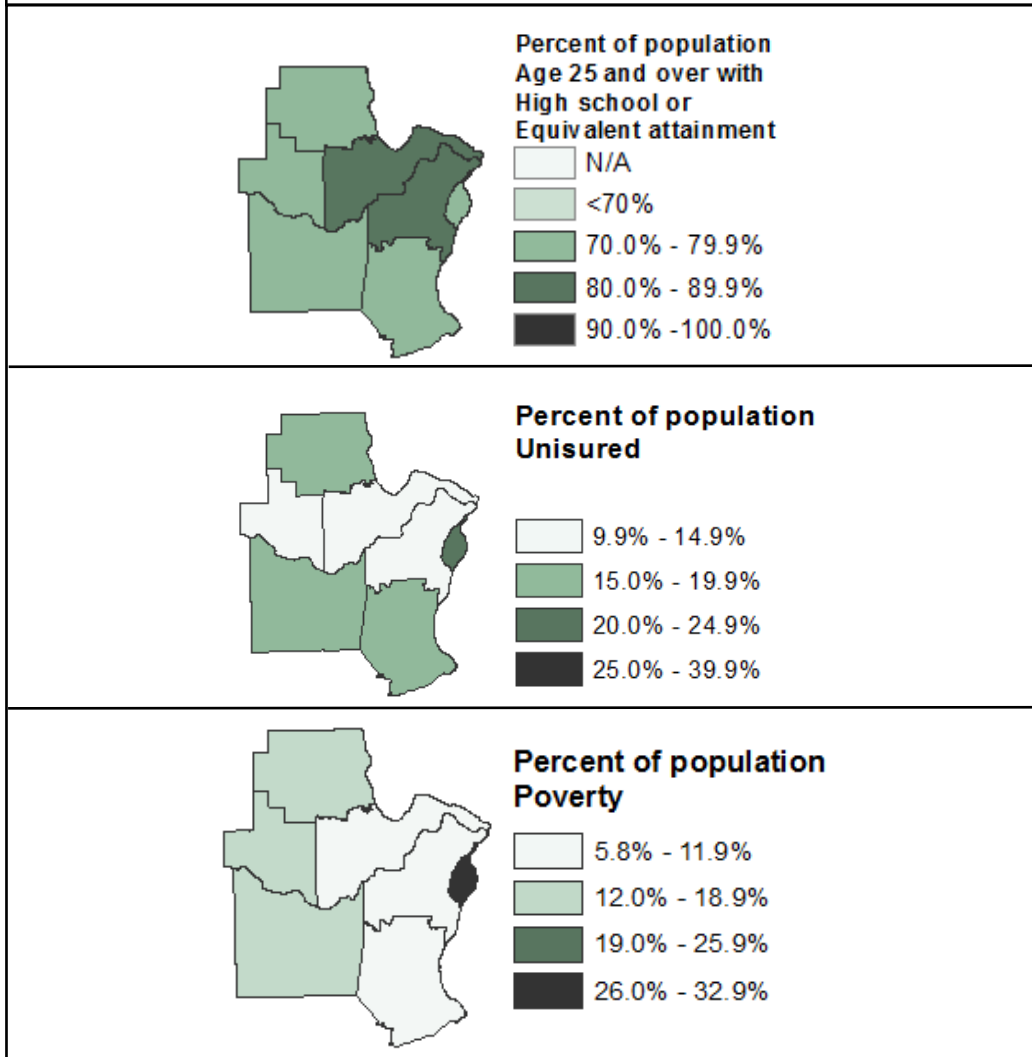
Figure 4.43: St. Louis Planning Region population estimates, by race, Missouri, 2014

County	White	Black	Other
Franklin County	97,329	1,033	3,722
Jefferson County	211,173	2,376	9,167
Lincoln County	50,691	1,037	2,521
St. Charles County	333,730	17,391	28,372
St. Louis County	676,809	237,227	87,840
St. Louis City	138,335	149,689	29,395
Warren County	30,567	765	1,921
Region Total	1,538,634	409,518	162,938
	72.9%	19.4%	7.7%

In the St. Louis Planning Region, the majority of the population age 25 year or older, as of 2014, had received at least a high school diploma or equivalent. The percentage of educational attainment in the region is higher than in most of the other planning regions; however, the percentage of educational attainment is lower in St. Louis City, as shown in Figure 4.44.<sup>39</sup>

The uninsured population within the St. Louis Planning Region is also shown in Figure 4.44. St. Louis City has the highest percentage of uninsured persons in this region. The percentage of uninsured persons is over 26% in St. Louis City, while surrounding areas have a much lower percentage.<sup>40</sup> The percentage of the population living in poverty again shows a large contrast between St. Louis City and the surrounding counties in Figure 4.44.<sup>41</sup>

Figure 4.44: Maps of the St. Louis Planning Region, sociodemographic characteristics, Missouri, 2014





## Hepatitis C

There were 7,803 hepatitis C cases reported in Missouri in 2015. This was a 24.8% increase from the number of cases reported in the previous year. Of the 7,803 cases, 2,592 were reported in the St. Louis Planning Region, which experienced a 20.1% increase from the number of cases reported in 2014.

Among the reported cases of chronic hepatitis C in the St. Louis Planning Region in 2015, four had unknown age. Of the 2,592 reported hepatitis C cases, 62.4% were male and 37.7% female (Figure 4.45). St. Louis City had the highest number of reported hepatitis C cases of all the counties in the state of Missouri, with 1,020 cases in 2015.

The 2015 cases of chronic hepatitis C in this region broken out by race revealed that 26.5% were among blacks, 29.7% were among whites, and 43.8% were among other/unknown, as shown in Figure 4.46.

In the St. Louis Planning Region, the largest numbers of hepatitis C cases were reported among persons 45 to 64 years of age at diagnosis, with 1,250 of the 2,592 total reported cases. Persons 25 to 44 years of age accounted for the next highest age group, with 848 hepatitis C cases, as shown in Figure 4.47.

Figure 4.45: Chronic hepatitis C cases, by sex, St. Louis Planning Region, Missouri, 2015

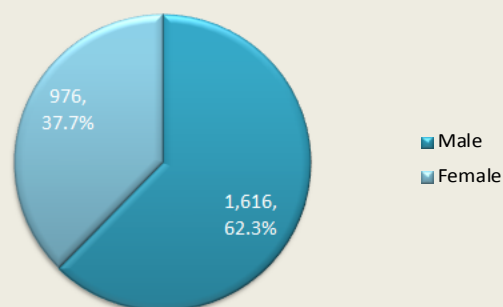


Figure 4.46: Chronic hepatitis C cases, by race, St. Louis Planning Region, Missouri, 2015

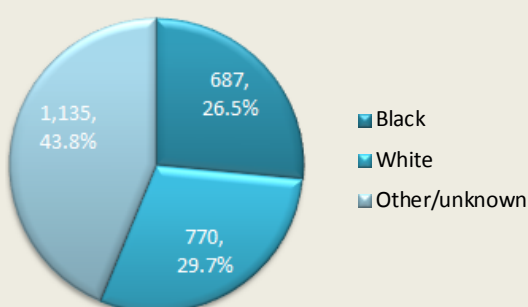


Figure 4.47: Chronic hepatitis C case counts and rates, by planning region and by age, Missouri, 2015

Age Group	St. Louis Count	St. Louis Rate	Kansas City Count	Kansas City Rate*	Northwest Count	Northwest Rate*	Central Count	Central Rate*	Southwest Count	Southwest Rate*	Southeast Count	Southeast Rate*	Missouri Count	Missouri Rate*
<2	2	3.9	0	0.0	0	0.0	1	4.8	1	3.5	2	16.4	6	4.0
2-12	2	0.7	3	1.7	0	0.0	1	0.9	1	0.6	0	0.0	7	0.8
13-18	10	6.1	7	7.4	0	0.0	3	4.5	16	17.5	7	18.2	43	9.1
19-24	184	112.7	36	41.1	38	177.1	117	122.8	134	122.2	88	221.3	597	115.5
25-44	848	153.9	195	60.6	178	328.8	622	296.7	616	221.7	518	433.0	2977	194.1
45-64	1250	215.1	371	118.4	153	259.6	446	195.9	693	234.8	350	260.1	3563	221.2
65+	292	94.4	121	74.0	15	39.2	57	40.1	64	33.0	47	55.3	596	63.9

\*Rate per 100,000 population

The distribution of cases of chronic hepatitis C in the St. Louis Planning Region (Figure 4.48) is under 200 cases per 100,000 residents in all counties, with the exception of St. Louis City. The rate in the City of St. Louis is greater than 300 per 100,000 residents.

Longitudinal trends of reported chronic hepatitis C cases in the St. Louis Planning Region show an overall increase from 2006 to 2015. The linear trend line in Figure 4.49 shows a calculated expression of the increase expected based on case counts of

the years shown; it is worth noting that 2008 and 2015 chronic hepatitis C counts in the St. Louis Planning Region were well above the trend line indicator. For 2015, the count was approximately 15.2% above the trend. The percentages of change over the last five years are in keeping with the percentages for the state overall in the same time period. The percentage of change for 2014 and 2015 in the St. Louis Region was slightly less than that of the state for the same years (Figure 4.50).

Figure 4.48: Chronic hepatitis C rates, St. Louis Planning Region, Missouri, 2015

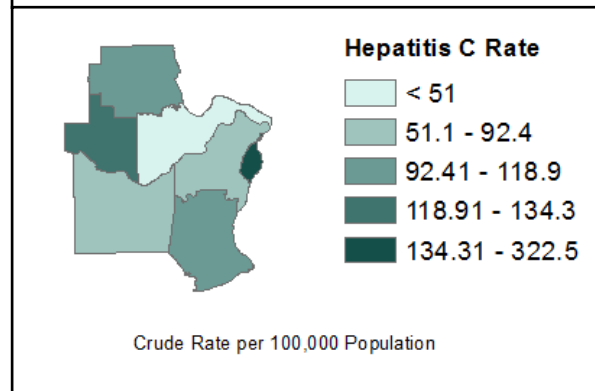


Figure 4.49: Chronic hepatitis C case counts, St. Louis Planning Region, Missouri, 2006-2015

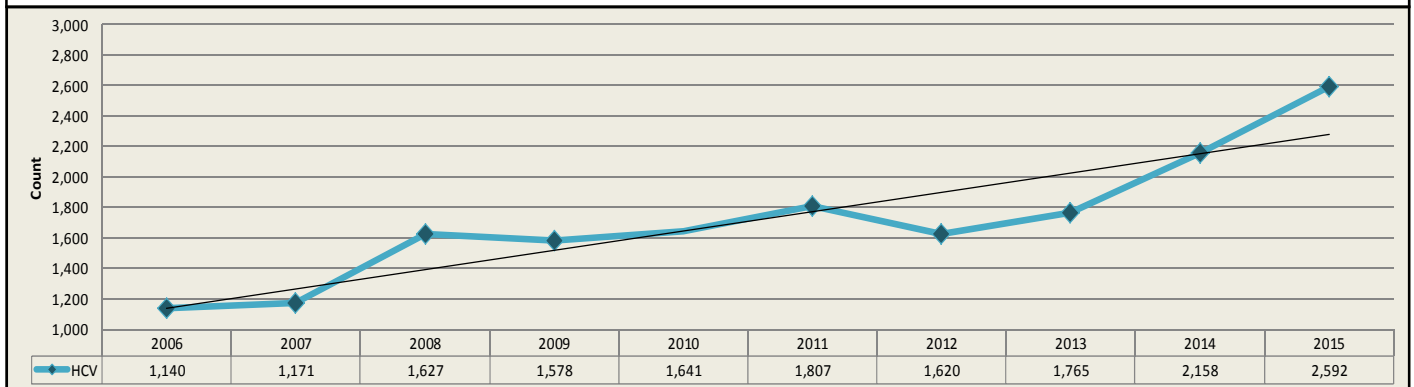
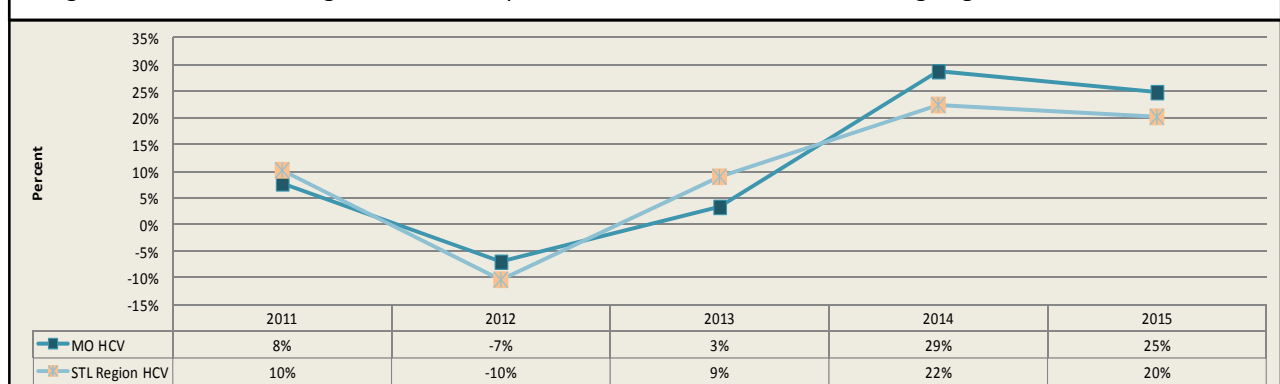


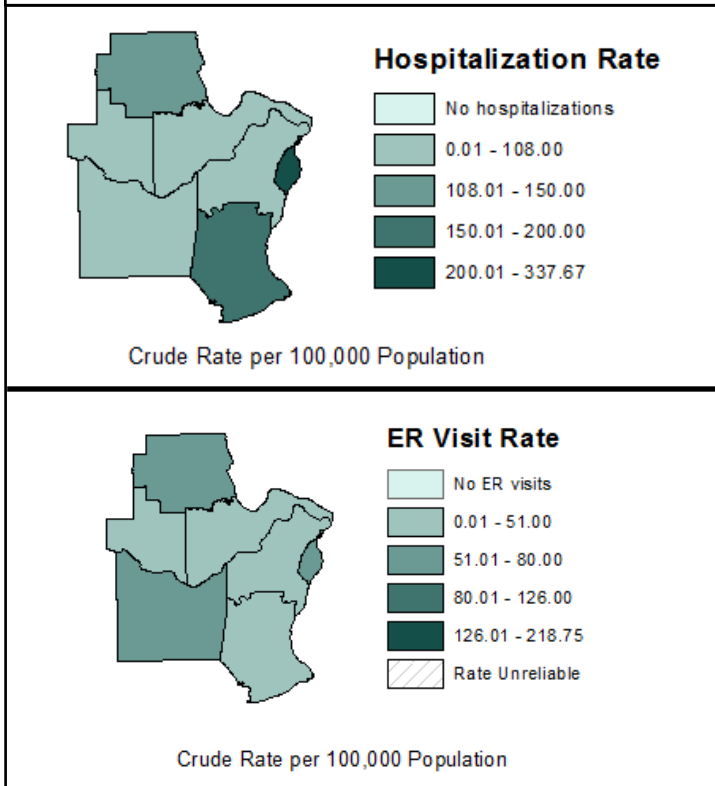
Figure 4.50: Percent change for chronic hepatitis C case counts, St. Louis Planning Region, Missouri, 2011-2015



As discussed in the Opioids and IDU section, use of injection drugs is a risk factor for transmitting blood-borne conditions such as hepatitis C. Several datasets reveal high usage of these drugs in the St. Louis area.

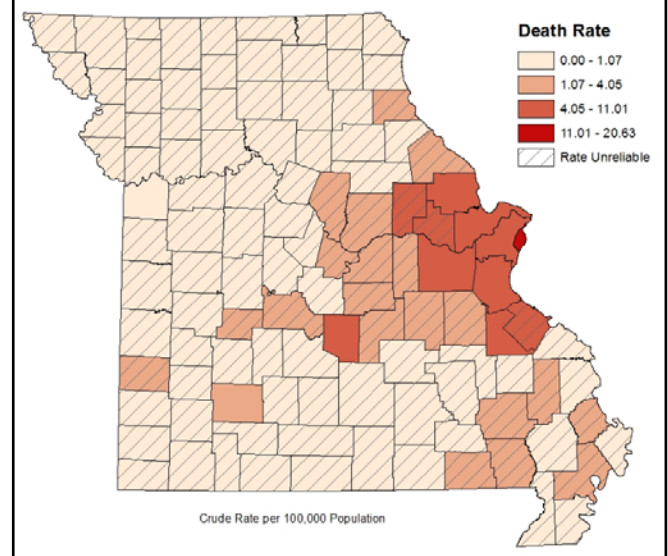
Hepatitis C-related hospitalization and ER visits for the St. Louis Planning Region are shown in Figure 4.51, with the highest rates in St. Louis City.

Figure 4.51: Hepatitis C-related hospitalization and ER visit rates, St. Louis Planning Region, Missouri, 2015



Geographic analysis of death data reveals a significant pattern. Heroin-specific death rates are extremely focused in the St. Louis metropolitan area (Figure 4.52). All but one Missouri county with a heroin rate above 4.0 was either located in the St. Louis metropolitan area or contiguous to it with the exception of Pulaski County which is located along I-44 between Springfield and St. Louis.<sup>42</sup>

Figure 4.52: Heroin death rates, St. Louis Planning Region, Missouri, 2011-2015



## Incarcerated Population

The Missouri Department of Corrections, Division of Adult Institutions is responsible for the management of the state's 21 adult correctional institutions. These institutions are represented as diamond in Figure 4.53.<sup>43</sup> Figure 4.54 shows the distribution rates of the incarcerated offender population by counties of origin or residence prior to incarceration.<sup>44</sup>

As of December 31, 2015, the Missouri Department of Corrections' adult correctional facilities housed 32,330 offenders. The largest portion of the offender population (13,959 persons) was 30 to 44 years of age. The remaining number of offenders was almost equally divided between

persons 30 years of age and younger (9,186 persons) and persons 45 years of age and older (9,185 persons).<sup>45</sup>

Among the offender population in 2015, 89.9% were males and 10.1% were females. Whites represented 62.6% of the offender population and blacks represented 35.0% of the population.<sup>44</sup> Almost 19% of the offender population (6,037 offenders) were convicted on drug-related charges, including drug possession, sales, manufacturing, and trafficking.<sup>46</sup>

Figure 4.53: Adult correctional facilities, Missouri, 2015

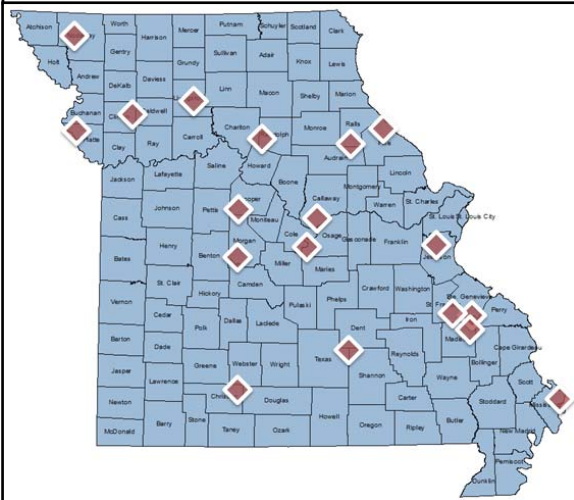
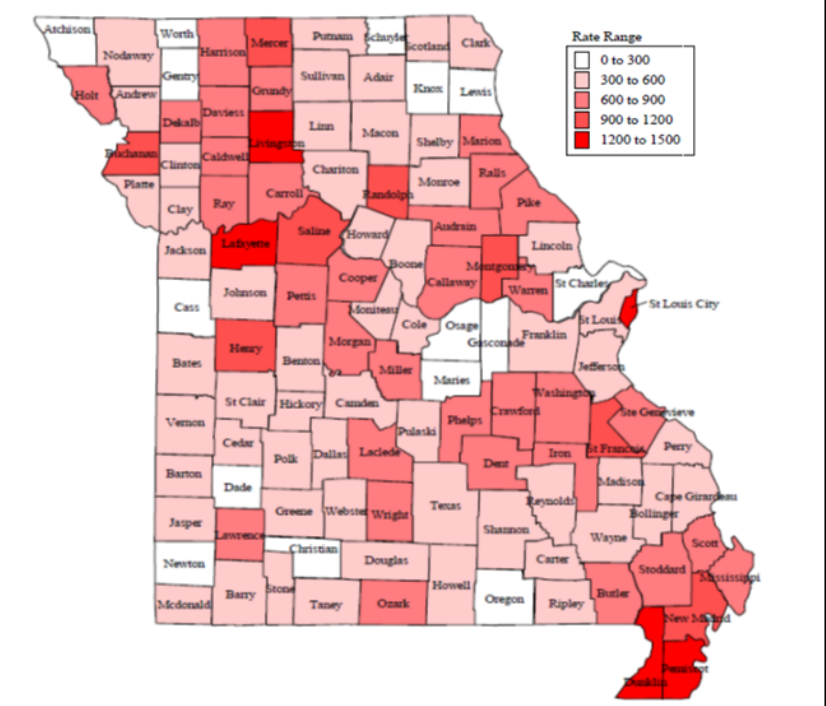


Figure 4.54: Rate of incarcerated offender population, by county of origin, Missouri, 2015



### Hepatitis C in Missouri Correctional Facilities

Hepatitis surveillance data are limited in regards to identifying persons tested at correctional facilities. Information in this section is based on hepatitis C cases reported to DHSS in which the address at the time of report was linked to a correctional facility in the state of Missouri.

The total number of hepatitis C cases identified over a 5-year period from 2011 to 2015 was 2,213. The total number of cases reported in 2015 was over 57% of the total of the 5-year count (Figures 4.55 and 4.56).

Based on estimates from the National Hepatitis Corrections Network, incarcerated populations may have a prevalence of hepatitis C between 12% and 35%, which is much higher than the 1% estimated for the general population in the U.S.<sup>47</sup> The national estimates for persons in correctional facilities is approximately 30%. By applying that figure to the Missouri 2015 prison population of 32,273, the total number of

incarcerated persons with hepatitis C infection can be estimated at approximately 9,700.<sup>48</sup> One reason for the high prevalence is that many populations who are most affected by incarceration, such as the poor, PWID, and the mentally ill, are also more likely to have hepatitis C.

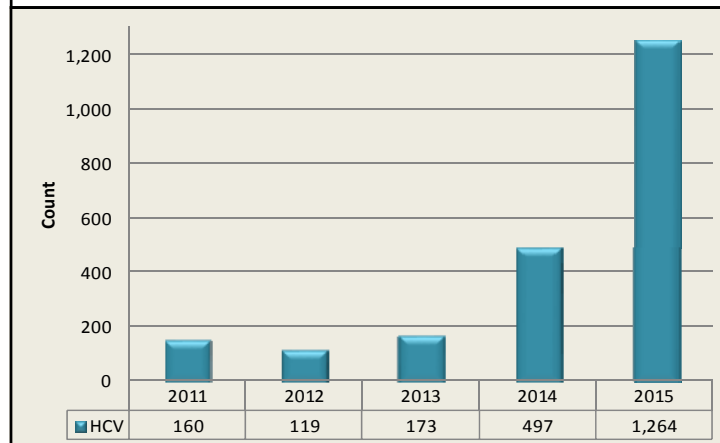
One major concern is the spread of the infection in local communities through needle sharing and other high risk behaviors by released offenders.<sup>49</sup>

The VHPP provides viral hepatitis education including modes of transmission, signs and symptoms and prevention information to offenders 30 to 45 days prior to release back into the community. The goal of this education is to provide knowledge to those that may be infected with hepatitis to prevent the spread of the disease. The VHPP also provides community resources for offenders who may need to follow up with a healthcare provider after release.

Figure 4.55: Hepatitis C cases diagnosed in correctional facilities, by age, Missouri, 2015

Age	Count	%
Unknown	0	0.0%
Ages 15 and under	1	0.1%
Ages 16 to 24	155	12.3%
Ages 25 to 44	824	65.2%
Ages 45 to 64	273	21.6%
Ages 65 and older	11	0.9%
Total	1,264	100.0%

Figure 4.56: Hepatitis C cases diagnosed in correctional facilities, by year, Missouri, 2011-2015

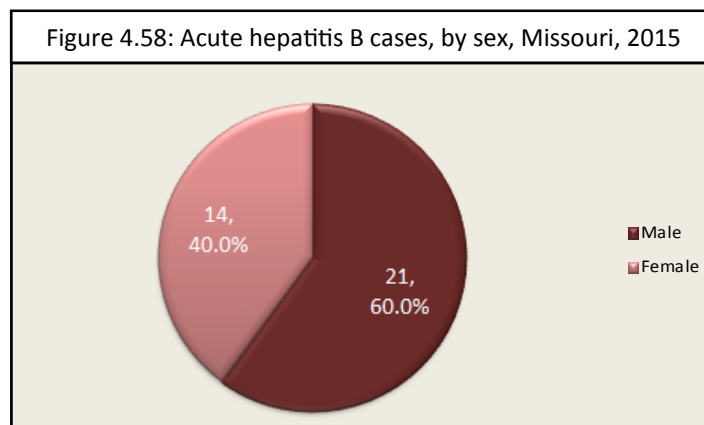
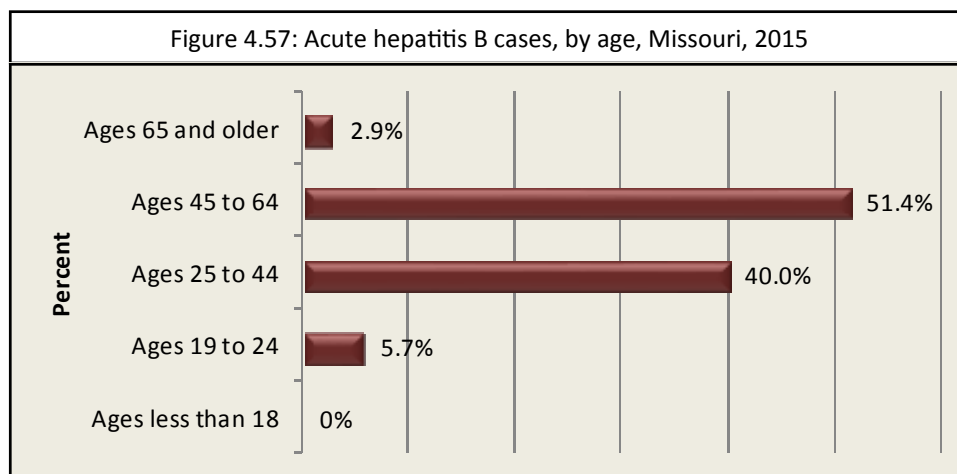


## Hepatitis C and Hepatitis B Co-infection

### Hepatitis B Information

Hepatitis B is a virus that affects the liver. It can be transmitted by blood, semen, or other bodily fluid exchange. Hepatitis B can also be transmitted from mother to child during child birth.<sup>50</sup> Since 1991, new hepatitis B infection rates have declined by approximately 82%. Hepatitis B infection can be prevented by vaccination and was first recommended for routine vaccination of children in 1991.<sup>51</sup> Children in Missouri have been required to be immunized against hepatitis B in order to start school since the 1997-1998 school year. In the 2014-2015 school year, 96.9% of all kindergarteners were vaccinated with at least three hepatitis B vaccination doses, which is required for immunity.<sup>52</sup> Hepatitis B infection has acute and chronic stages and is classified based on the NNDL case definitions. While treatments do exist to lessen the liver damage caused by the virus, there is no cure at this time.

In 2015, there were 35 cases of acute hepatitis B reported in Missouri. Ninety-one percent of the cases reported were among persons aged 25 to 64 years. There were no cases reported in those under the age of 19 years in 2015 (Figure 4.57). The distribution of males and females is similar to that of hepatitis C, as 60.0% of the cases reported in 2015 for acute hepatitis B were among males and 40.0% among females (Figure 4.58). Whites accounted for 75.3% of the reported acute hepatitis B cases in Missouri. The St. Louis and Southwest Planning Regions accounted for 22 of the 35 cases reported (62.9%).



In Missouri there were 520 cases of chronic hepatitis B reported in 2015. The age groups of 25 to 44 years and 45 to 64 years accounted for 84.8% of all cases. The age group of 25 to 44 years accounted for 223 (42.9%) cases of chronic hepatitis B infection, while 45 to 64 years accounted for 218 (41.9%) (Figure 4.59).

Males accounted for approximately 62% of reported chronic hepatitis B cases while females accounted for approximately 38% (Figure 4.60). The 2015 incidence rate for males of 10.8 cases per 100,000 population is 1.7 times higher than the 6.4 incidence rate for females.

Approximately 61% of all chronic hepatitis B cases had a race of other/unknown. Of the 317 cases in the other/unknown racial category, 221 were unknown. While whites accounted for 24.8% and blacks only 14.2% of all reported chronic hepatitis B cases, the incidence rate for blacks was four times higher than the rate for whites, at 10.5 and 2.7 per 100,000 population, respectively.

The St. Louis Planning Region reported the highest number of chronic hepatitis B cases, with 231 (Figure 4.61). This planning region also had the highest rate of newly reported infections at

10.9 cases per 100,000 population. The Kansas City Planning Region had the second highest rate of newly reported infections, at 8.3 cases per 100,000 population.

### Hepatitis C and Hepatitis B Co-infection

Hepatitis B infection is considered a risk factor for hepatitis C. Hepatitis B weakens the immune system and makes contracting the hepatitis C virus easier. The two viruses also share similar modes of transmission, which makes co-infection likely. Co-infection of hepatitis C and hepatitis B also increases the risk of serious liver damage and the risk of progressing to liver cancer. Most persons who are co-infected acquired both viruses through exposure to contaminated blood through the use of: unscreened blood products, unsterilized medical equipment, or intravenous drugs. Treating co-infected persons is difficult, as treatment for hepatitis C infection may reactivate or worsen hepatitis B infection.<sup>53</sup>

In Missouri, there were 21 persons who were newly reported and co-infected with both the hepatitis C and hepatitis B viruses in 2015. With such limited data available, it is difficult to derive any meaningful conclusions.

Figure 4.59: Chronic hepatitis B cases, by age, Missouri, 2015

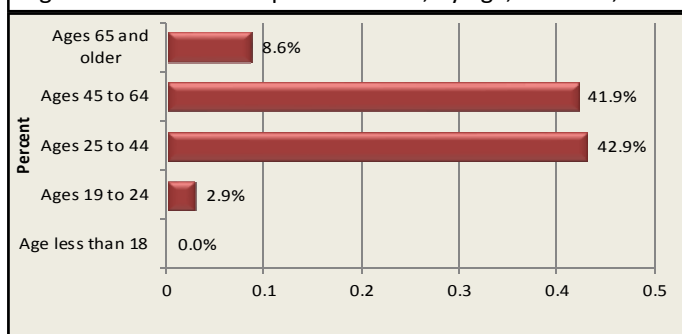


Figure 4.60: Chronic hepatitis B cases, by sex, Missouri, 2015

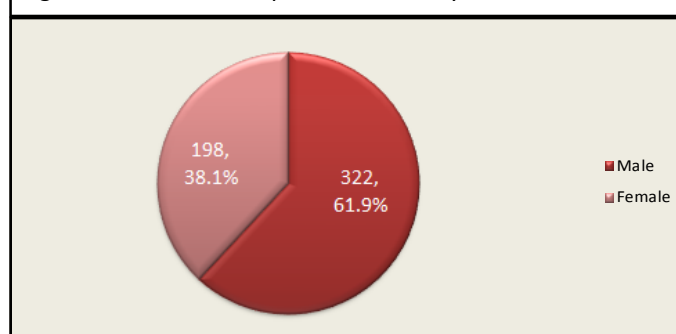
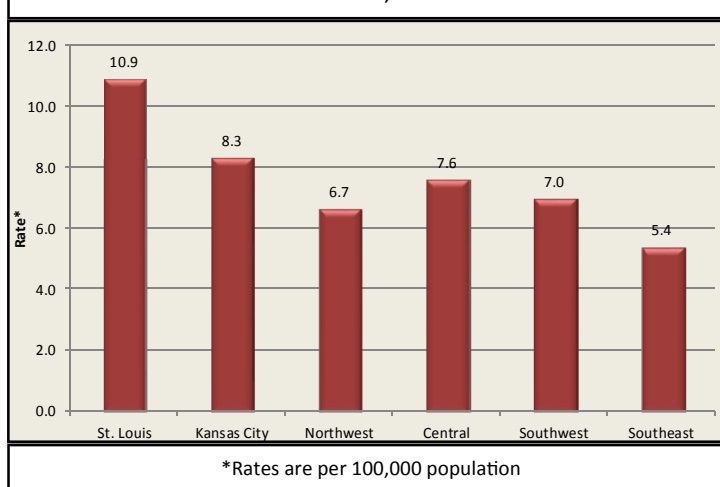


Figure 4.61: Chronic hepatitis B cases, by planning region, Missouri, 2015





## Hepatitis C and HIV Disease Co-infections

### HIV Disease Information

All individuals infected with HIV are classified as having HIV disease, with progression of the disease classified as stages 0 to 3. HIV disease includes all individuals diagnosed with HIV regardless of the stage of disease progression. All persons with HIV disease can be sub-classified as either an **HIV case** (if they are in the earlier stages of the disease process and have not met the criteria for stage 3, formerly called AIDS, case definition) or a **stage 3 (AIDS) case** (if they are in the later stages of the disease process and have met the case definition for stage 3 (AIDS)).<sup>54</sup>

From 1982 to 2015, a total of 20,312 HIV disease cases have been diagnosed in Missouri and reported to DHSS. Of the cumulative cases reported, 60.4% were still presumed to be living with HIV disease at the end of 2015. Among the 12,259 Missourians living with HIV disease, 5,900 were classified as HIV cases at the end of 2015, and 6,359 were classified as stage 3 (AIDS) cases (Figure 4.62). Of the 468 persons newly diagnosed with HIV disease in 2015, 22.0% were classified as stage 3 (AIDS) cases by the end of 2015.

### Age

The rate of new HIV disease diagnoses was greatest among persons 19 to 24 years of age at the end of 2015, at 23.0 per 100,000 population. Changes have occurred in the distribution of the age at diagnosis among new HIV disease cases and in the age of living cases over time. In 2006, the greatest proportion of new diagnoses occurred among those aged 40 to

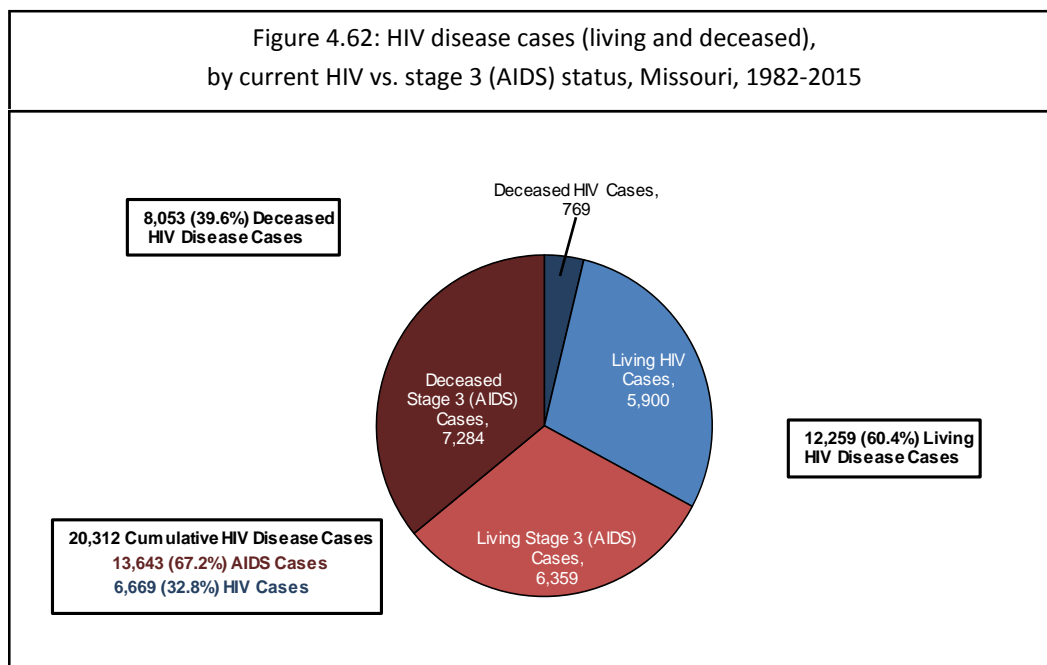
44 (17.0%) and 25 to 29 (16.7%). In 2015, the greatest proportion of new diagnoses occurred among those aged 19 to 24 (26.0%). The difference may be attributed to increased testing among younger individuals or due to a true increase in the number of new infections at a younger age. In 2006, the greatest proportion of living cases was among those aged 40 to 44 (23.0%), while by 2015, the greatest proportion of living cases was between 50 to 54 years old (18.0%).

### Sex

Of the 12,259 persons living with HIV in Missouri at the end of 2015, 83.0% were males. The rate of those living with HIV disease was five times higher among males compared to females. The rate of new HIV disease diagnoses was similar, at 5.2 times as high among males compared to females.

### Race

Although whites represented the largest proportion (48.0%) of living HIV disease cases, the prevalence rate of those living with HIV disease was 6.6 times higher among blacks compared to whites. The rate was 1.7 times higher among Hispanics compared to whites. Among males, the rate of living cases among blacks was 5.8 times higher than the rate among whites, and 1.6 times higher among Hispanics compared to whites. Among females, the rate of those living with HIV disease among blacks was 13.3 times higher than the rate for whites, and 2.6 times higher for Hispanics compared to whites. The rate of new HIV disease cases was 7.8 times higher among blacks compared to whites, and 2.1 times higher among Hispanics compared to whites.



## Hepatitis and HIV Co-infection

Persons with HIV infection are often affected by viral hepatitis. According to CDC, of the people living with HIV in the U.S., about 25% are co-infected with hepatitis C, and about 10% are co-infected with hepatitis B. The percentage of co-infection with hepatitis C increases to about 80% for people with HIV who also inject drugs.<sup>55</sup>

Hepatitis and HIV co-infection more than triples the risk for liver disease, liver failure, and liver-related death from hepatitis C. Viral hepatitis progresses faster and causes more liver-related health problems among people with HIV than among those who do not have HIV. Although drug therapy has extended the life expectancy of people with HIV, liver disease—much of which is related to hepatitis C and hepatitis B—has become the leading cause of non-AIDS-related deaths for persons living with HIV disease.<sup>56</sup>

Of the 12,259 individuals living with HIV disease in Missouri, 101 were reported with a hepatitis co-infection in 2015 (Figure 4.64). The majority of those reported with a hepatitis co-infection were diagnosed with HIV prior to 2015 (approximately 89%). The largest number of HIV co-infections was with chronic hepatitis C.

The proportion of reported hepatitis infections in 2015 who were living with HIV varied by infection type. Of the 520 chronic hepatitis B cases reported in 2015, approximately 5% were among individuals living with HIV. About 1% of chronic hepatitis C cases reported in 2015 were among individuals living with HIV.

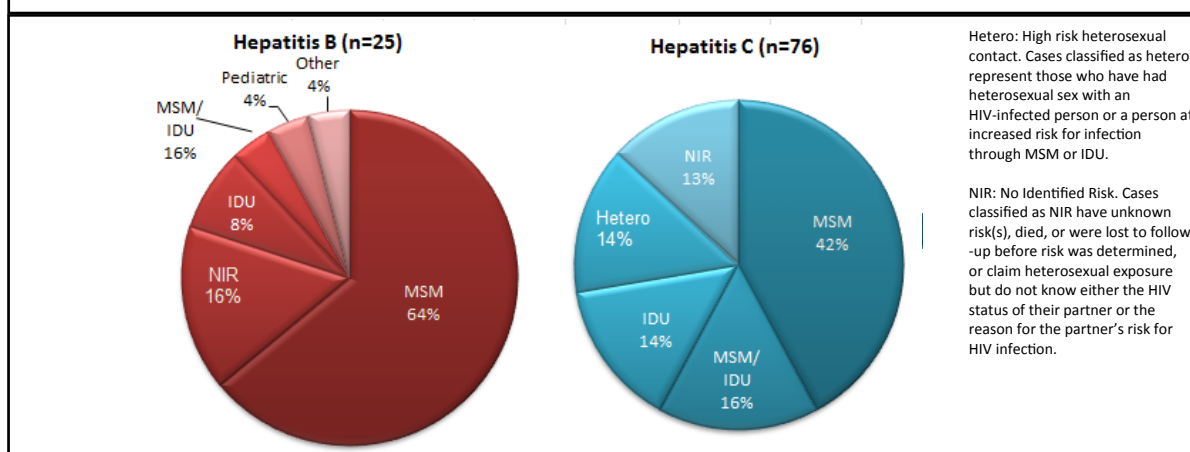
Among persons living with HIV disease who were reported with only a hepatitis B infection in 2015, almost 68% were residing in the St. Louis Planning Region at the time of the hepatitis diagnosis. Among HIV-positive persons reported with only a hepatitis C infection in 2015, the greatest proportion (nearly 58%) were also residing in the St. Louis Planning Region at the time of the hepatitis diagnosis.

Among persons living with HIV disease and reported with only a hepatitis B infection in 2015, approximately 64% were among men who have sex with men (MSM) (Figure 4.65). Among hepatitis C co-infection cases, an estimated 42% were attributed to MSM, and about 16% were attributed to both IDU and MSM. There were no hepatitis B and C co-infections among persons living with HIV disease in 2015.

Figure 4.63: Reported hepatitis B and C infections among persons living with HIV disease, Missouri, 2015

Co-infection	Diagnosed with HIV Prior to 2015 Number	Diagnosed with HIV in 2015 Number	Total Co-infections Number
Acute Hepatitis B	0	1	1
Chronic Hepatitis B	21	3	24
Prenatal Hepatitis B	0	0	0
Perinatal Hepatitis B	0	0	0
Acute Hepatitis C	0	0	0
Chronic Hepatitis C	69	7	76
Chronic Hepatitis B & C	0	0	0
<b>Total</b>	<b>90</b>	<b>11</b>	<b>101</b>

Figure 4.64: HIV and hepatitis co-infections, by HIV exposure category and type of co-infection, Missouri, 2015



## Hepatitis C and Sexually Transmitted Diseases Co-infection

### STD Information

#### Primary and Secondary Syphilis

In 2015, a total of 307 primary and secondary syphilis cases were reported in Missouri. There were no incidences of co-infection with hepatitis B or C and primary or secondary syphilis.

#### Chlamydia and Gonorrhea

Chlamydia and gonorrhea are both STDs which are caused by bacteria.<sup>57, 58</sup> These diseases can infect the mouth, genitals, or anus of persons who have sexual contact with an infected individual.<sup>59</sup> Most cases of chlamydia and gonorrhea are treatable by readily available antibiotics. In 2015, Missouri had 37,890 reported cases of chlamydia and gonorrhea.

The risk factors for contracting chlamydia and gonorrhea, such as inconsistent condom usage and serial monogamy (having several short-term monogamous relationships in direct succession), are most commonly associated with younger populations.<sup>60</sup> Approximately 47% of all chlamydia and gonorrhea cases in Missouri were reported among the 19 to 24 age group (Figure 4.66). This age group also had the highest infection rate at 3,467.8 cases per 100,000 population. The age

group with the second highest rate of infection was 13 to 18 year olds, with a rate of 1,518.9 cases per 100,000 population. Those aged 25 to 44 years accounted for 31.2% of Missouri's reported cases in 2015, but they had the third highest rate of infection at 770.4 cases per 100,000 population.

Of the cases reported to DHSS, 63.6% were in females and 36.4% were in males. The rate per 100,000 population of newly reported cases for females (780.5) was 1.7 times higher than the rate for males (463.2).

Blacks are disproportionately affected by chlamydia and gonorrhea as they make up only 11.6% of Missouri's population but accounted for 42.7% of all reported chlamydia and gonorrhea cases in 2015. The rate of infection for blacks (2,304.1 cases per 100,000 population) is 7.8 times higher than the infection rate for whites (294 cases per 100,000 population). The rate for blacks is also substantially higher than the statewide rate of 624.9 cases per 100,000 population.

The Kansas City Planning Region experienced the highest rate of new infections at 782.4 per 100,000 population (Figure 4.67). The second highest rate of 752.8 cases per 100,000 population occurred in the St. Louis Planning Region. The other four planning regions had rates that ranged from 418.3 to 485.0 cases per 100,000 population. The St. Louis and Kansas City Planning regions accounted for 66.5% of Missouri's reported cases in 2015.

Figure 4.65: Reported chlamydia and gonorrhea cases, by age, Missouri, 2015

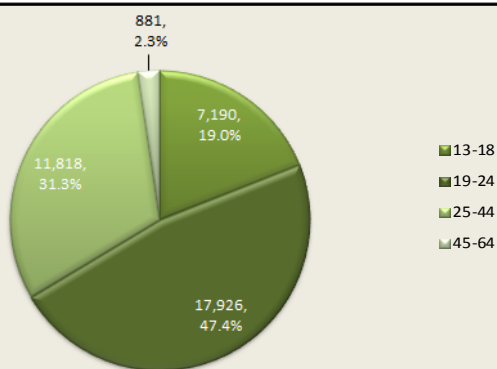
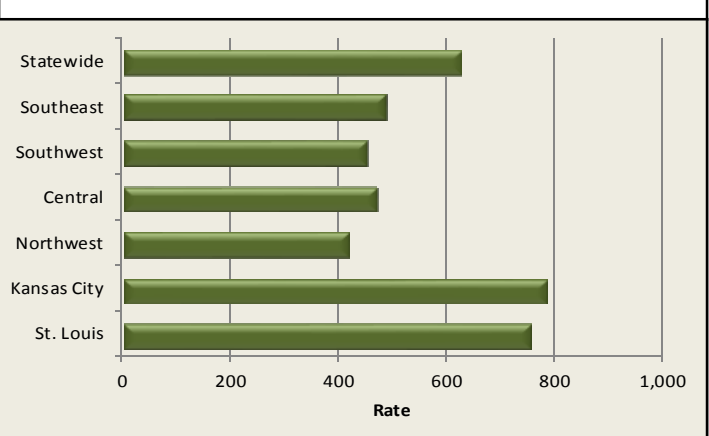


Figure 4.66: Chlamydia and gonorrhea incidence rates per 100,000 population, by planning region, Missouri, 2015



### Hepatitis C and STD Co-infections

Hepatitis C can be contracted through sexual activity. If a person already has an STD, it can increase his/her risk of hepatitis C infection. Behaviors that put a person at risk of STD infection, such as multiple partners or rough sex, also increase the risk of hepatitis C infection. National surveillance data show that 15 to 20% of persons with no other reported risk factors for acute hepatitis C infection have a history of sexual exposure.<sup>61</sup>

In 2015, there were 134 cases of persons co-infected with hepatitis C and either gonorrhea or chlamydia. The rate of co-infection was highest in those aged 19 to 24 years (8.3 cases per 100,000 population), but the majority of cases were reported among those aged 25 to 44 years (60.5%) (Figure 4.68). Of those who were co-infected, the majority (70.9%) were females. While only 18.7% of cases reported a race of black, the black incidence of co-infection was the highest, at 3.6 cases per 100,000 population. Whites had the lowest incidence of co-infection at 1.9 cases per 100,000 population but reported 93 of the 134 cases of co-infection in 2015.

Figure 4.67: Incidence rate of STD and hepatitis C co-infections per 100,000 population, by age, Missouri, 2015

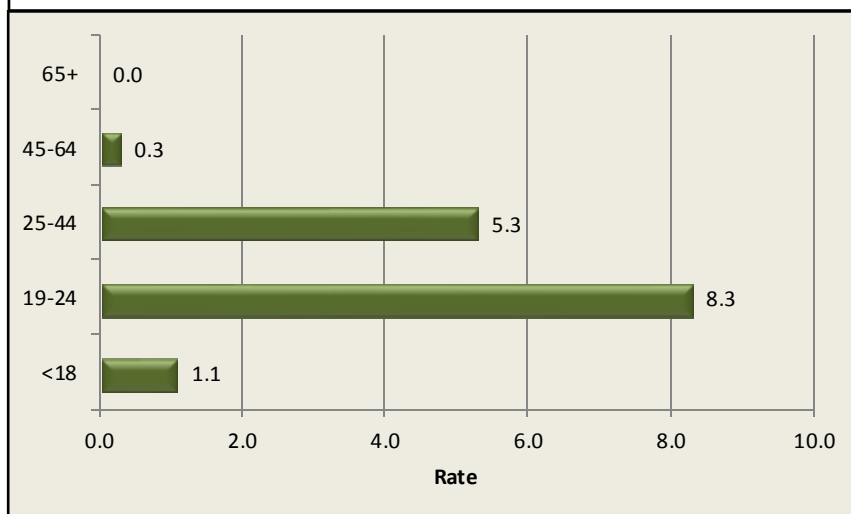
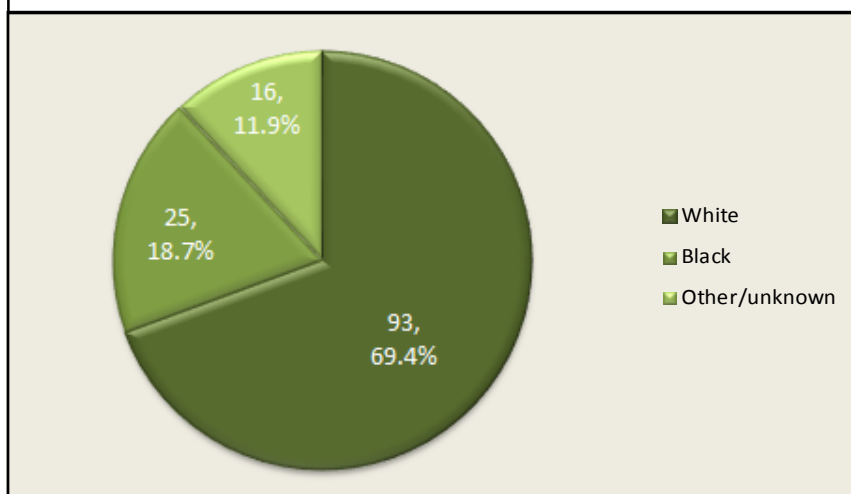


Figure 4.68: STD and hepatitis C co-infected cases, by race, Missouri, 2015



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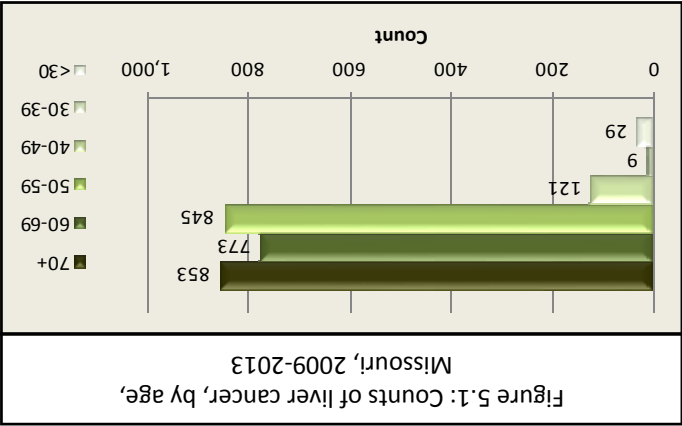
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Care and Complications

The liver is the largest internal organ in the body. Inflammation of the liver is known as hepatitis and may be caused by many conditions. For our purposes, hepatitis refers to inflammation due to a virus, namely hepatitis B or hepatitis C.

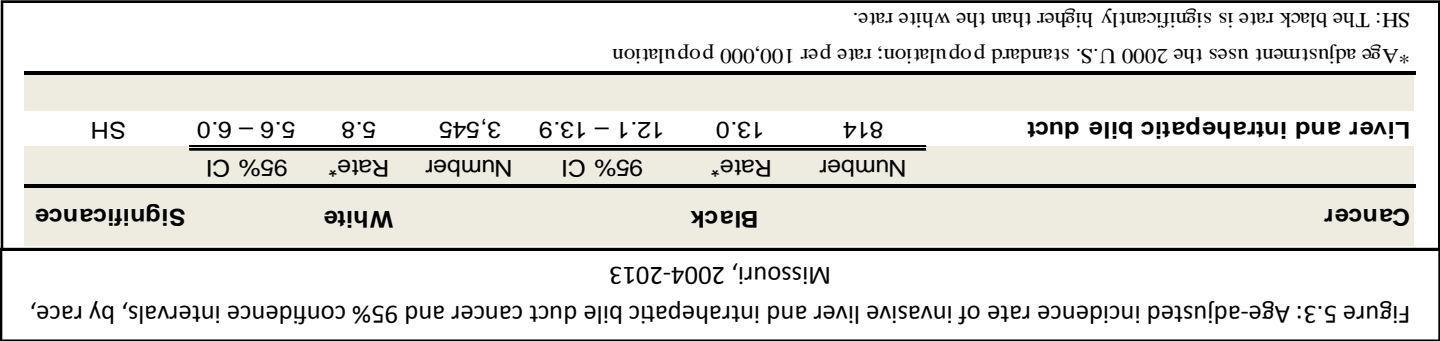
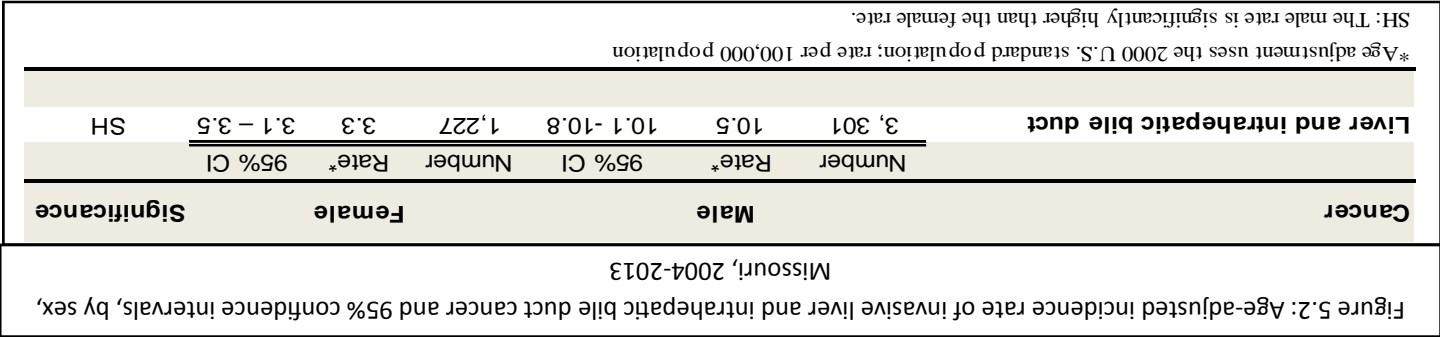
Many people who are infected with viral hepatitis have no or very mild symptoms and therefore go undiagnosed for years or decades. Due to this extended length of time undetected, hepatitis can cause serious scarring known as fibrosis. Fibrosis prevents the liver from functioning properly but is reversible with proper treatment. However, if fibrosis is not treated early, it may lead to cirrhosis, extensive scarring of the liver that is not reversible but may be slowed by treating the underlying causes. If left untreated viral hepatitis may lead to liver cancer or require a liver transplant.



People who are infected with hepatitis C are more than 2.5 times more likely to be diagnosed with liver cancer than individuals without hepatitis.<sup>1</sup> According to CDC, viral hepatitis is considered to be a major factor in liver cancer incidence in the U.S.<sup>2</sup> Nationwide, liver cancer incidence increased by approximately 72% from 2003 to 2012, with the highest rates of liver cancer among Baby Boomers.

The total number of liver and intrahepatic bile duct cancers between 2004 and 2013 was 4,528. The majority of cases were among the population 50 years and older (2,471 out of 2,630) as shown in Figure 5.1.<sup>3</sup> The age-adjusted incidence rate of liver and intrahepatic bile duct cancer was significantly higher among males than among females for the period 2004 through 2013 (Figure 5.2) and significantly higher among blacks than whites (13.0 vs. 5.8 per 100,000 population, respectively) during the same time period (Figure 5.3).

Hepatitis C and Hepatocellular Cancer





## Liver Transplants

In Missouri, the most recent transplant data available are from 2014. In that year, a total of 52 liver transplants occurred among persons infected with hepatitis C. This is a 15.4% decrease from the number of transplants in 2010 (Figure 5.4).

Over the last five years (2010 through 2014), the number of liver transplants related to hepatitis C infection has been 2.9 times higher among males than among females.

No one under the age of 25 years had a liver transplant related to hepatitis C infection in the last five years. Over 86% of all hepatitis-related liver transplants from 2010 to 2014 were among those aged 45-64 years.

Approximately 80% of all liver transplants related to hepatitis C infection between 2010 and 2014 were among whites. Blacks accounted for the next largest percentage of transplants, at 12.9% (Figure 5.5).

Figure 5.4: Count of liver transplants in persons infected with hepatitis C, by year, Missouri, 2010-2014

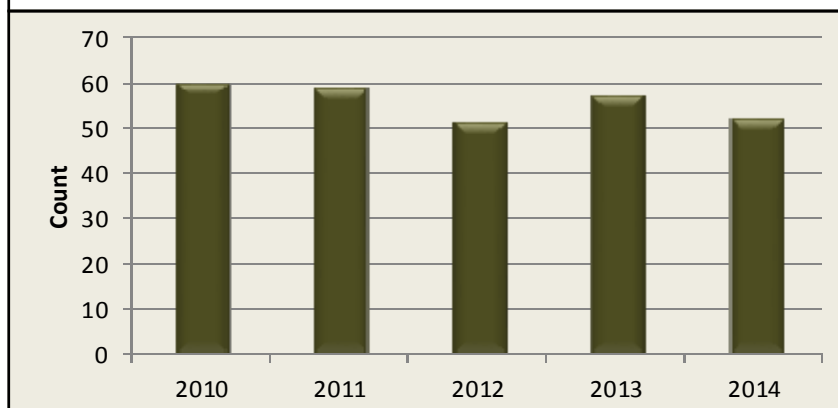
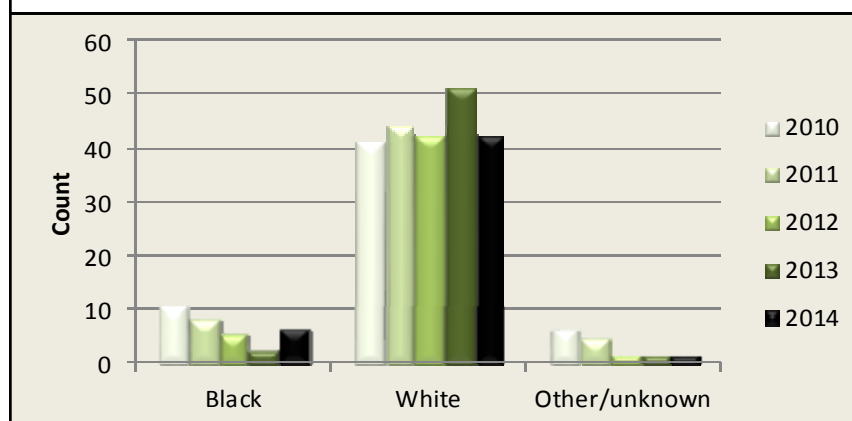


Figure 5.5: Count of liver transplants in persons infected with hepatitis C, by race and year, Missouri, 2010-2014



## Hospitalizations

According to a study published in the *Journal of Viral Hepatitis*, hospitalizations and ER visits related to hepatitis C are most often associated with chronic hepatitis C. Complications resulting from chronic hepatitis C include cirrhosis of the liver, liver cancer, renal cancer, and non-Hodgkin's lymphoma. Since hepatitis C is typically an asymptomatic condition until later in the disease, costs associated with hepatitis C-related hospitalizations are rising as more Baby Boomers are experiencing complications associated with chronic hepatitis C. The article indicates that the costs associated with hepatitis C-related hospitalizations and ER visits are higher than the costs of direct treatment of persons with hepatitis C.<sup>4</sup> As such, hepatitis testing is crucial to identify persons who are not aware of their status in order to link them to treatment and care. In turn, ER visits and hospitalizations associated with hepatitis C would likely decline.

Missouri patient abstract data from BHCADD identify the number of inpatient hospitalizations and ER visits with acute, chronic, or unspecified hepatitis C listed in any of the 23 diagnosis fields of patient records. The most recent patient abstract data available are from 2014.

The number of hepatitis C-related ER visits increased 26.8% from 2010, with 7,490 visits, to 2014, with 9,497 visits.

In 2014, the highest rate of hepatitis C-related ER visits occurred in Ste. Genevieve County at 1,484.5 visits per 100,000 population. The second highest rate of hepatitis C-related ER visits in 2014 was in St. Francois County, with 1,458.2 visits per 100,000 population. Both counties are located in the Southeast Planning Region. Figure 5.6 shows the distribution of hepatitis C-related ER visits in Missouri in 2014.

The number of hepatitis C-related inpatient hospitalizations increased 12.2% from 2010, with 14,131 hospitalizations, to 2014, with 15,848 hospitalizations. In 2014, the highest rate of inpatient hospitalizations related to hepatitis C was in St. Francois County, with 3,281.7 hospitalizations per 100,000 population, followed by Ste. Genevieve County with 1,668.6. Figure 5.7 shows the distribution of inpatient hospitalizations related to hepatitis C in Missouri in 2014.

Figure 5.6: Hepatitis C-related ER visits, Missouri, 2014

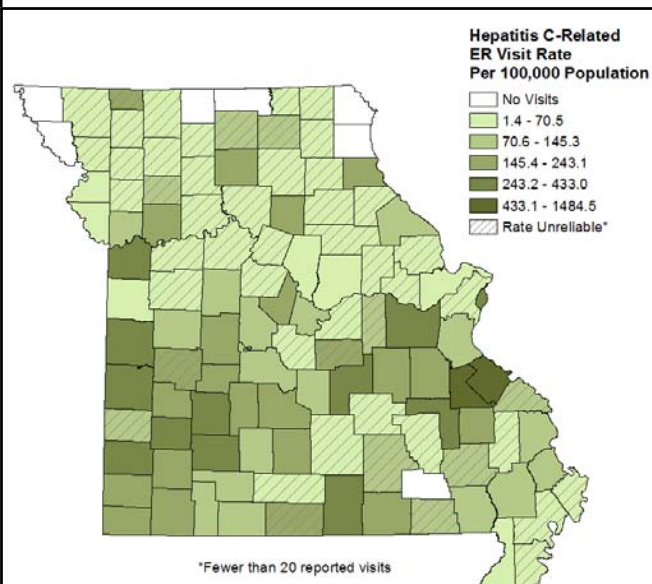
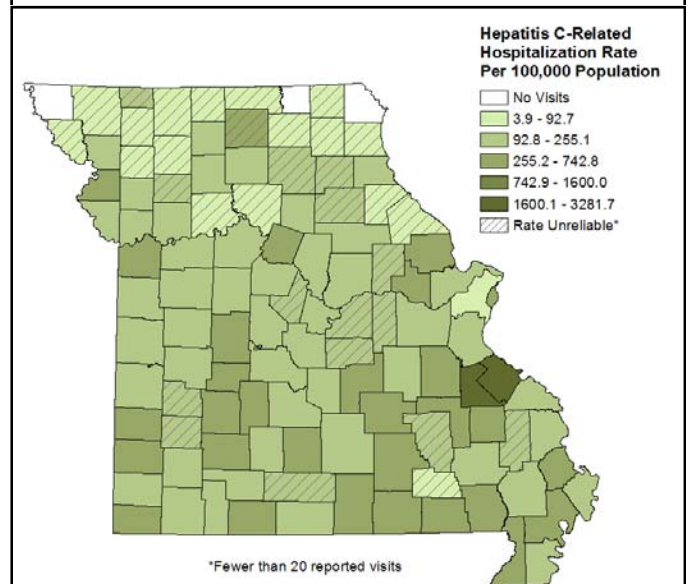


Figure 5.7: Hepatitis C-related inpatient hospitalizations, Missouri, 2014



## Mortality

Mortality refers to the deaths that may be attributed to a disease or condition. The disease or condition could be the underlying (primary) cause of death or a contributing cause of death.

BRDI collaborates with the Bureau of Vital Statistics and receives death certificates for persons who died in Missouri with hepatitis B or C listed as an underlying or contributing factor for death. This is the only death ascertainment activity conducted by DHSS; therefore, death data are very limited. Even with the limited death information available to DHSS, it is known that more persons infected with viral hepatitis die in Missouri each year than persons infected with HIV.

According to CDC, up to 5% of persons infected with hepatitis C will die from consequences of chronic infection. In 2014, hepatitis C infection was listed as an underlying or contributing cause of death for an estimated 19,659 people in the U.S.; these deaths are estimated to be only a fraction of the actual deaths caused by hepatitis C.<sup>5</sup>

In 2015, there were 237 deaths among Missouri residents who died in Missouri with hepatitis C listed as an underlying or

contributing cause (Figure 5.8). The majority (73.8%) of these deaths occurred among those aged 45 to 64 years (Figure 5.8). Persons in this age group had a hepatitis C mortality rate of 10.9 deaths per 100,000 population. This mortality rate is almost twice that of those aged 65 years and greater (5.9).

Three times as many male deaths (175) compared to female deaths (62) had hepatitis C listed as an underlying or contributing cause on the death certificate in 2015 (Figure 5.9). The mortality rate per 100,000 for hepatitis C was approximately three times higher for males (5.9) than for females (2.0) in 2015.

Whites had the highest number of deaths with hepatitis C listed as an underlying or contributing cause (186). The mortality rate for blacks (6.1 deaths per 100,000 population) was 1.6 times higher than that for whites (3.8).

The Southwest Planning Region reported both the highest number (67) and the highest mortality rate (5.8 deaths per 100,000 population) of deaths with an underlying or contributing cause of death listed as hepatitis C in 2015 (Figure 5.10). The St. Louis Planning Region had the second highest number of deaths at 60, but the lowest mortality rate at 2.8.

Figure 5.8: Hepatitis C-related deaths, by age in years at death, Missouri, 2015

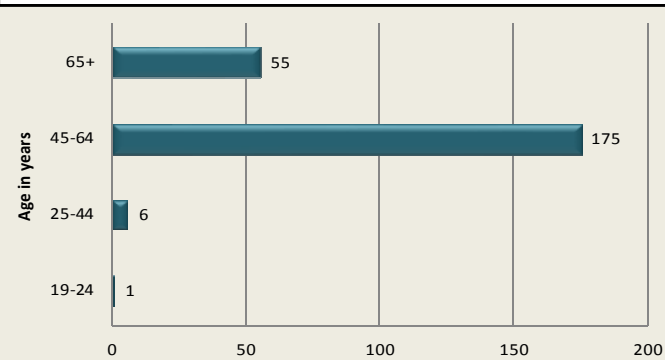


Figure 5.9: Hepatitis C-related deaths, by sex, Missouri, 2015

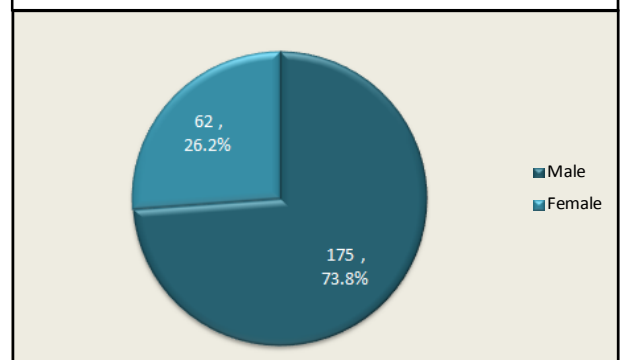
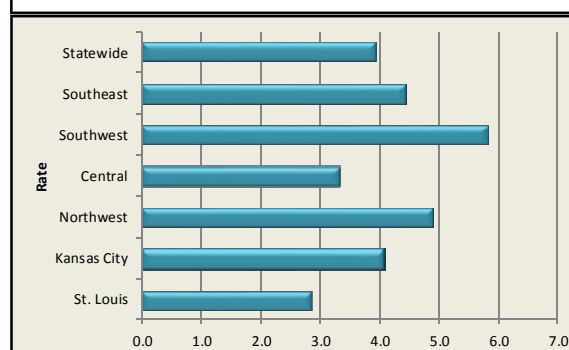


Figure 5.10: Hepatitis C mortality rates per 100,000 population, by planning region, Missouri, 2015



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## Next Steps

The goals of the *HEpi Profile* are to explain the impact of hepatitis C in Missouri, disseminate statistical data about hepatitis C for planning purposes, promote screening recommendations, and inform policy makers of the need for prevention and care services within the state. During the creation of this first *HEpi Profile*, many challenges were faced by the team and programs. With challenges came opportunities for many discussions and brainstorming sessions with regard to the future of the *HEpi Profile* and the programs as a whole.

One of the first challenges discussed during the creation process was the gaps in and limitations of hepatitis surveillance data in Missouri. Due to resource shortages, reports of hepatitis are not routinely followed up in order to gather missing data elements. In response to this challenge, BRDI applied for the *Strengthening Surveillance in Jurisdictions with High Incidence of Hepatitis C Virus (HCV) and Hepatitis B (HBV) Infections* grant from CDC. Missouri was approved, but not funded, for the grant award. As such, DHSS is in the process of identifying alternative methods to improve surveillance activities, such as ascertaining acute versus chronic status and improving the collection of demographic and risk factor information. Minimizing these gaps in surveillance data will greatly enhance future editions of the *HEpi Profile* as more accurate descriptions of the populations infected will be possible.

Another challenge of explaining the impact of hepatitis C in Missouri was identifying data sources other than surveillance data. The team collaborated with other bureaus within DHSS to gain access to data sources that had not been previously analyzed in conjunction with hepatitis C data. This allowed for a more comprehensive view of those populations most at risk of contracting hepatitis C. As other sources of data are identified in the coming years, the content of the *HEpi Profile* is expected to expand to give a more comprehensive and accurate view of populations at risk for hepatitis infection in Missouri.

One of the opportunities provided by the *HEpi Profile* is distribution of the information to those who are able to act. Stakeholders were identified and surveyed at the beginning of the *HEpi Profile* creation process. The announcement of the project was met with a round of applause from stakeholders. Stakeholders completed surveys regarding the proposed content and planned usage of the *HEpi Profile*. These surveys

indicated that the content was in line with perceived needs. The surveys will be distributed again once the *HEpi Profile* is completed and stakeholders have had an opportunity to use it. In future versions, the content can be revised to improve usage for planning purposes. Utilization of the *HEpi Profile* will also be monitored to see who is using the data and how the data are being used.

In order to promote screening recommendations, the *HEpi Profile* was used to create specialized fact sheets that can be distributed among populations at most risk for current/future infection with hepatitis C or to stakeholders. Four fact sheets have been developed regarding Baby Boomers, persons who inject drugs, known risks for hepatitis C, and hepatitis C-related deaths. Surveyed stakeholders also suggested pregnant women and references on where to get tested and/or treated as topics.

The final goal of the *HEpi Profile* is to inform policy makers of the need for hepatitis prevention and care services in Missouri. As stated in section 192.033 of the Revised Statutes of Missouri (RSMo), DHSS is charged with “providing reliable information to policy makers.” The demonstration of the needs and gaps in prevention and care services in this consolidated and data-driven document offers an additional method of providing that information. Policy makers in Missouri have recognized the importance of addressing hepatitis C, as evidenced by the adoption of sections 192.033 and 192.036, RSMo. Section 192.033, RSMo, lists several strategies DHSS can use in raising public awareness of this disease, and section 192.036, RSMo, gives DHSS the authority to carry out National Institutes of Health guidelines for educating physicians, health professionals, and training providers on various guidelines related to detection, diagnosis, treatment, and decision making. Section 192.036.2, RSMo, states that the “duties prescribed in this section shall be subject to appropriations by the general assembly.” However, funds have not been appropriated to carry out these duties. Prevention and care services for those at risk for and infected with hepatitis C will require resources not currently available.

## Acknowledgments

The Missouri Department of Health and Senior Services Bureau of HIV, STD, and Hepatitis and the Bureau of Reportable Disease Informatics would like to thank the following individuals and groups for their assistance in creating the first *Epidemiologic Profile of Viral Hepatitis in Missouri (HEpi Profile)*.

### HEpi Profile Project Team

#### Bureau of HIV, STD, and Hepatitis

Linda Ball, ADN, RN, Viral Hepatitis Program Manager

Anna Long, Health Education Supervisor

#### Bureau of Reportable Disease Informatics

Becca Mickels, MBA, Chief

Fei Wu, MD, PhD, Senior Epidemiology Specialist

Zana Stephenson, BA, Epidemiology Specialist

Angela McKee, BS, Research Analyst IV

Debby Hutton, MBA, Research Analyst II

### Other Contributors

#### Section for Disease Prevention

Ken Palermo, MM, Administrator

Damon Ferlazzo, MPA, Deputy Administrator

#### Bureau of HIV, STD, and Hepatitis

Nicole Massey, LCSW, Chief

#### Bureau of Reportable Disease Informatics

Amanda Branson, Administrative Office Support Assistant

#### Bureau of Health Care Analysis and Data Dissemination

Andrew Hunter, MA, Chief

Whitney B. Coffey, MA, Research Analyst IV

Evan Mobley, MS, Research Analyst IV

#### Bureau of Vital Statistics

Loise Wambuguh, PhD, Chief

Shilo Bender, BA, Research Analyst III

Wayne Schramm, MA

#### Office of Epidemiology

Sherri Homan, RN, FNP, PhD, Public Health Epidemiologist

Philomina Gwanfoghbe, MSPH, CHHC, PhD, Epidemiology Specialist

### Special Thanks

The *HEpi Profile* Team would like to extend a special thank you to all the local public health agency staff and the Missouri Comprehensive (Community) Prevention Planning Group members who provided feedback and support regarding the creation and content of this report.

## HEpi Profile Feedback Form

Thank you for utilizing the *Epidemiologic Profile of Viral Hepatitis in Missouri—2015*. The *HEpi Profile* Project Team would greatly appreciate if you would complete our [electronic feedback](#) form. The feedback provided will be used by the team when planning the next *HEpi Profile*.

## Appendix A: Utilization Plan





## **Missouri Department of Health and Senior Services**

### **Viral Hepatitis Epidemiologic Profile: Utilization Plan**

**January 2017**

## Utilization Plan

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## Utilization Plan

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### 1) PURPOSE OF THE PROFILE AND UTILIZATION PLAN

The following plan is designed to provide a roadmap for activities to promote the awareness of the findings presented in the Missouri Department of Health and Senior Services' (DHSS') *Epidemiologic Profile of Viral Hepatitis in Missouri*. This profile will be created using funds awarded from the Association of State and Territorial Health Officials (ASTHO) grant, *Building State/Territorial Health Department Capacity to Develop & Utilize Viral Hepatitis Epidemiologic Profiles*. DHSS received notification of this award in a letter dated January 3, 2017.

Development of the profile was conducted by staff in the Bureau of HIV, STD, and Hepatitis (BHS) and the Bureau of Reportable Disease Informatics (BRDI) within DHSS. This grant period was originally scheduled to end June 30, 2017, but was later extended to September 30, 2017. However, the utilization and benefits will persist.

The epidemiologic profile was designed to increase public and professional awareness and to inform policies for viral hepatitis prevention, care, and planning. The purpose of a viral hepatitis epidemiologic profile is to document, interpret, and frame the dimensions and impact of the epidemic in local terms that can be used to heighten awareness and inform decision making. In order to be successful and maximize public health use of the data, such a project requires the development and implementation of a well-organized, effectively-managed communications strategy so that the profile will reach a wide range of high-risk groups, partners, stakeholders, decision makers, and policy makers, as well as the general public. With this in mind, the profile development team cooperated with partners and stakeholders through this plan to develop a profile that would:

- Identify and address specific audiences at risk for hepatitis C and/or hepatitis B infection.
- Increase public support for health improvement initiatives.
- Educate and remind the public about healthy behaviors and risks.

Thus, the main purpose of this plan is to provide a coordinated effort in educating and informing target audiences of findings. This plan evolved throughout the process of developing the profile and collaborating with stakeholders and partners. This final utilization plan will be submitted along with the final version of the profile at the end of the grant period on September 30, 2017. This profile helps fulfill DHSS' duty to raise public awareness of hepatitis C as authorized by Section 192.033 of the Revised Statutes of Missouri.

## Utilization Plan

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### **2) MISSOURI'S HEPATITIS SURVEILLANCE BACKGROUND**

DHSS maintains an integrated statewide surveillance system, WebSurv, that is used to collect, analyze, and produce reports on a wide variety of reportable diseases and conditions, including hepatitis B virus (HBV) and hepatitis C virus (HCV). Per the Missouri Code of State Regulations (CSR) 19 CSR 20-20.020, laboratories and medical providers are required to report hepatitis B and hepatitis C laboratory results to DHSS within three calendar days of first knowledge or suspicion of disease. Surveillance information from WebSurv is disseminated to public health partners, other stakeholders, policy makers, and the general public in order to:

- Identify potential outbreaks of HBV and/or HCV.
- Monitor trends among specific populations and/or geographic areas to determine where to target public health intervention activities.
- Evaluate the efficacy of control measures.

## Utilization Plan

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### 3) SUPPORTING OBJECTIVES

- Reports are published on the DHSS website to provide information to public health partners, other stakeholders, policy makers, and the general public. Annually, HBV and HCV demographic, geographic, and HIV co-morbidity data analyses are included in the *Epidemiologic Profile of HIV, STD, and Hepatitis in Missouri* (<http://health.mo.gov/data/hivstdaids/data.php>).
- DHSS is very interested in producing a report that is specific to viral hepatitis. HBV and HCV cases have risen in Missouri in the past five years, with 2015 accounting for the largest number of reported HBV and HCV cases in reporting history. A dedicated epidemiologic profile will help to educate and inform public health partners, other stakeholders, policy makers, and the general public more effectively and in a more consumer-friendly manner than previously available reports. DHSS submitted an application for the *Strengthening Surveillance in Jurisdictions with High Incidence of Hepatitis C Virus (HCV) and Hepatitis B Virus (HBV) Infections* grant from CDC. Missouri was approved but not funded for the grant award. As such, DHSS is in the process of identifying alternative methods to improve surveillance activities.
- The Viral Hepatitis Prevention Program (VHPP) within BSHS was recently awarded the *Improving Hepatitis B and C Cascades: Focus on Increased Testing and Diagnosis* grant from CDC. BRDI and VHPP are closely collaborating on collection, maintenance, and analysis for this grant and are currently performing a situational analysis.
- Injection drug use (IDU) is a risk factor for HCV infection. On June 3, 2016, CDC released a national assessment that identifies counties in the United States (U.S.) that may be vulnerable to an outbreak of HIV and HCV among people who inject drugs (PWID). Thirteen of Missouri's counties (11.3 percent) were identified in the "County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs (PWID), United States" published in the *Journal of Acquired Immune Deficiency Syndromes (JAIDS)*. In response to the assessment, BSHS and BRDI have convened meetings of local public health representatives, HIV/HCV prevention partners, and other relevant stakeholders to identify steps that can be taken to minimize the likelihood of an outbreak, rapidly detect an outbreak should one occur, and promptly intervene in and disrupt such an outbreak if it were to occur in Missouri. To date, there have been no documented outbreaks of hepatitis B or C in Missouri, but DHSS will use the information gleaned from the aforementioned coordination efforts to develop a thorough outbreak response plan. Missouri was also recently awarded the *Enhanced State Surveillance of Opioid-Involved Morbidity and Mortality* grant from the CDC due to the high volume of opioid use in Missouri. BRDI staff are collaborating with staff in the Bureau of Health Care Analysis and Data Dissemination, which is managing the opioid grant.

## Utilization Plan

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### 4) TARGET AUDIENCES

**The Missouri Department of Health and Senior Services (DHSS) will use the profile to:**

- Better inform decisions regarding hepatitis.
- Provide evidence-based data to policy makers.
- Inform legislative liaisons to help them better advocate for policy changes and/or increased funding.

**The Bureau of HIV, STD and Hepatitis (BHSB) will use the profile to:**

- Develop manuals and other materials to prevent and/or respond to outbreaks.
- Identify and respond to trends.
- Focus efforts in high incidence and prevalence areas of the state for education and testing purposes.
- Assess staffing and other resource needs.

**The Missouri Viral Hepatitis Prevention Program (VHPP) will use the profile to:**

- Guide allocation of resources to areas that need awareness education and/or testing.
- Provide data in easy-to-understand formats such as infographics, website pages, brochures, etc.
- Evaluate program efforts.

**The Health Education and Risk Reduction (HERR) Unit will use the profile to:**

- Help guide resources for training, such as development of educational materials.
- Identify and target at-risk populations.
- Focus training in high prevalence areas.

**The Bureau of Reportable Disease Informatics (BRDI) will use the profile to:**

- Disseminate hepatitis surveillance data and related information.
- Evaluate hepatitis data quality.

## Utilization Plan

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**Community-Based Organizations (CBOs) and Local Public Health Agencies (LPHAs) will use the profile to:**

- Help direct their available resources.
- Focus efforts in high prevalence areas.
- Educate their clients.

**The Comprehensive Prevention Planning Group (CPPG) and Viral Hepatitis Committee (VHC) will use the profile to:**

- Address prevention concerns for populations most at risk and those infected with HIV, STDs, and viral hepatitis.
- Focus efforts in high prevalence areas.

**Special interest groups will use the profile findings to:**

- Provide useful information to other agencies such as the Missouri Department of Corrections, the Missouri Department of Social Services, and the Missouri Department of Mental Health.
- Share useful information with health insurance companies.
- Make useful information available to policy makers.

**The general public and citizens of Missouri will use the profile to:**

- Develop an increased awareness of the impact of hepatitis in Missouri statewide, in specific geographic areas, and among different demographic groups.
- Better understand the need for resources that address hepatitis and prevent its spread.



## Utilization Plan

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### 5) PUBLIC AWARENESS THROUGH MEDIA AND OTHER COMMUNICATIONS TOOLS

- News Releases—News releases and/or articles will be distributed to media when appropriate to communicate DHSS activities and encourage media coverage.
- Collateral Materials—To build awareness of specific viral hepatitis health-related issues, messages, posters, fact sheets, and brochures may be placed at key public places or high profile events in the state throughout the year.
- Websites—Reports are published on the DHSS website to provide information to public health partners and the general public. The DHSS website and other existing websites will be utilized as appropriate for link placement of the final Viral Hepatitis Epidemiologic Profile.
- Social Media—The current web presence and social networking communications (such as Facebook and Twitter) of DHSS and external partners and stakeholders will be leveraged where pertinent and in accordance with State of Missouri and DHSS policies.
- Distribution Lists—Electronic distribution lists of DHSS and external partners and stakeholders will be utilized in accordance with State of Missouri and DHSS policies.
- Friday Facts—DHSS distributes a weekly newsletter to internal and LPHA staff that highlights new resources and training opportunities. Announcements of new publications and requests for feedback could be included in the newsletter for up to three consecutive issues.
- Snapshot—DHSS also publishes a bi-monthly newsletter for internal staff to raise awareness of Department activities and events. BRDI submitted a piece to highlight the receipt of the ASTHO grant, the development of the hepatitis profile, and the recent release of the updated *Epidemiologic Profiles of HIV, STD, and Hepatitis in Missouri*.

## Utilization Plan

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### 6) STAKEHOLDER ENGAGEMENT, COMMUNITY RELATIONS, AND EVENTS

- BRDI, VHPP, HIV Prevention, and HERR staff met weekly during development of the profile and will continue to meet at least monthly for three months after completion to discuss progress on the epidemiologic profile and any promotional or other activities that are needed. These staff will continue to meet quarterly after that time to discuss ideas for annual updates to the profile.
- BSHS and BRDI staff traveled to a high-morbidity region (Southeast Missouri) to share information about the profile with LPHAs, to garner feedback on what information should be included in the profile, and to discuss ideas for annual updates to the profile. Since DHSS staff is centrally located in the state travel to visit this region was budgeted using grant funds. DHSS staff also met with LPHA staff and other stakeholders in Boone County and St. Louis County. Additional meetings and conferences are being planned.
- The Missouri Hepatitis C Alliance is a CBO that serves as a dedicated advocate for testing and education for at-risk populations. The Alliance provides input for content and use of the profile and met with the project team during CPPG meetings and as needed. This group will be asked for additional input in the future.
- CPPG and VHC are made up of community stakeholders who are interested in and advocate for people infected with HIV, STD, and viral hepatitis. CPPG includes LPHAs, CBOs, and the general public. This group provided input for use of the profile and development of needed educational materials. CPPG met in person in March. BSHS and BRDI staff attended that meeting to provide information on the project. VHC met in December 2016 and met again in February 2017 via conference calls. These groups will be asked for additional input in the future.
- The Center for Local Public Health Services (CLPHS) within DHSS sponsored a Statewide Public Health Conference that occurred on March 21-23 in Jefferson City. Information about the profile was shared with conference attendees through an exhibit. Other information was included in a “swag” packet that distributed to each LPHA in attendance. BSHS and BRDI staff participated on a opioid abuse panel and covered the related hepatitis epidemic and hepatitis profile in the discussion.
- CLPHS coordinates several other meetings in various locations across the state throughout the year at which information about the profile could be shared. Although the profile team did not have the opportunity to attend these meetings during the grant period, they may provide a change to share the profile in the future.
- Profile contents and information can be included in various DHSS and external stakeholder newsletters and publications.

- Topic-specific presentations can be tailored to key audiences as needed. Presentations can be prepared upon request, and DHSS will be proactive in seeking other opportunities to present at conferences, meetings, etc. The project team is currently planning to share information at a BSHS meeting. The team is also working to schedule an Epi Grand Round on the profile during October 2017. Epi Grand Rounds are held at DHSS and broadcast to LPHAs.

## Utilization Plan

### 7) INTERNAL COMMUNICATIONS MATRIX

The following table identifies the internal communication requirements for this project.

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverables
Project status meetings	Discuss progress on the epidemiologic profile and what activities are needed	<ul style="list-style-type: none"> <li>• Face to face</li> <li>• Conference call</li> <li>• Internal network repository</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>• Project team</li> </ul>	<ul style="list-style-type: none"> <li>• Project lead</li> </ul>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• Meeting minutes</li> </ul>
Project status reports	Report the status of the project, including activities, progress, costs and issues	<ul style="list-style-type: none"> <li>• Internal network repository</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>• Project sponsor</li> <li>• Project team</li> <li>• Stakeholders</li> <li>• CDC</li> <li>• ASTHO</li> </ul>	<ul style="list-style-type: none"> <li>• Project lead</li> </ul>	<ul style="list-style-type: none"> <li>• Project status report</li> <li>• Details required for monthly invoices to be paid</li> </ul>
Technical status meetings	Report the status of the project development and design	<ul style="list-style-type: none"> <li>• Face to face</li> <li>• Internal network repository</li> </ul>	Weekly/As needed	<ul style="list-style-type: none"> <li>• Project team</li> </ul>	<ul style="list-style-type: none"> <li>• Technical lead</li> </ul>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• Meeting summary</li> </ul>
Technical design meetings	Discuss and develop technical design solutions for the project	<ul style="list-style-type: none"> <li>• Face to face</li> <li>• Internal network repository</li> </ul>	As needed	<ul style="list-style-type: none"> <li>• HERR staff</li> <li>• Project team</li> </ul>	<ul style="list-style-type: none"> <li>• HERR lead</li> </ul>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• Meeting minutes</li> </ul>
Lessons Learned	Reviewed the strengths and weaknesses of the profile development process to improve efficiency for the next version	<ul style="list-style-type: none"> <li>• Face to face</li> <li>• Internal network repository</li> </ul>	Annually	<ul style="list-style-type: none"> <li>• Project team</li> </ul>	<ul style="list-style-type: none"> <li>• Section for Disease Prevention Deputy Administrator</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation Plan</li> </ul>

## Utilization Plan

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### 8) EVALUATION

An evaluation plan has been developed according to guidelines provided by CDC and ASTHO. Evaluation results will be submitted at the end of the grant period (September 30, 2017).

### 9) ACTION PLAN

(January 1, 2017 – December 30, 2017\*)

Action Steps	Who	Start	Complete	Notes
Items due for “swag” boxes for Missouri Public Health Conference	Zana Stephenson, Epidemiology Specialist (Epi Spec)  Debby Hutton, Research Analyst II	January 23	February 3	Agreed upon using the Pre-Published Survey forms
Article on hepatitis epidemiologic profile due for submission to DHSS <i>Snapshot</i> newsletter	Becca Mickels, BRDI Bureau Chief	February 1	February	Article was submitted but the <i>Snapshot</i> newsletter has not yet been published recently do to staff turnover in the Office of Public Information
Missouri Public Health Conference	Angela McKee, Research Analyst IV  Zana Stephenson, Epi Spec  Debby Hutton, Research Analyst II	January 23	March 21-23	BRDI had a presence at the Conference vendor table and surveys were available in paper format to distribute  For Survey & Results, see Attachment A

CPPG 2 <sup>nd</sup> Quarter Meeting	<p>Fei Wu, Sr. Epi Spec</p> <p>Angela McKee, Research Analyst IV</p> <p>Zana Stephenson, Epi Spec</p> <p>Debby Hutton, Research Analyst II</p> <p>Anna Long, Health Education Supervisor</p>	January 23	March 30	<p>Members of Project team presented the pre- published survey via ARS with 40 voting members</p> <p>For Survey &amp; Results, see Attachment A</p>
Draft profile submitted for internal DHSS approvals	<p>Becca Mickels, BRDI Bureau Chief</p> <p>Zana Stephenson, Epi Spec</p>	April 17	April 17	Completed
Draft profile due to ASTHO/CDC for comment	<p>Becca Mickels, BRDI Bureau Chief</p> <p>Linda Ball, RN Viral Hepatitis Prevention Manager</p>	April 28	April 28	Completed

<i>HEpi Profile</i> SEMO Trip: St. Francois County Health Department  Ste. Genevieve County Health Department	Linda Ball, RN Viral Hepatitis Prevention Manager  Zana Stephenson, Epi Spec  Debby Hutton, Research Analyst II	May 15	May 15	For Agenda & Highlights, see Attachment C
<i>HEpi Profile</i> SEMO Trip: Cape Girardeau County Health Department  Scott County Health Department  Butler County Health Department	Linda Ball, RN Viral Hepatitis Prevention Manager  Zana Stephenson, Epi Spec  Debby Hutton, Research Analyst II	May 16	May 16	For Agenda & Highlights see Attachment C
<i>HEpi Profile</i> SEMO Trip: Howell County Health Department  Pulaski County Health Department	Linda Ball, RN Viral Hepatitis Prevention Manager  Zana Stephenson, Epi Spec  Debby Hutton, Research Analyst II	May 17	May 17	For Agenda & Highlights see Attachment C
ASTHO/CDC will provide comments	ASTHO/CDC	May 15— Pending response		



Final profile due to ASTHO/CDC	Becca Mickels, BRDI Bureau Chief  Linda Ball, RN Viral Hepatitis Prevention Manager			
St. Louis Hepatitis C Workgroup	Linda Ball, RN Viral Hepatitis Prevention Manager  Zana Stephenson, Epi Spec	June 13, 2017	June 13, 2017	
Hepatitis C North Central Community Advisory Group	Anna Long, Health Education Supervisor	June 13, 2017	June 13, 2017	
Missouri Rural Health Conference	TBD	August 15- 17, 2017		
Show-Me Summit	TBD	September 11-13, 2017 Columbia		
Announcement of publication of hepatitis profile due to <i>Friday Facts</i> for inclusion in September 30 issue	BRDI Research Analysts or Bureau Chief			Pending approval of the profile by the Office of Public Information
Addendum to utilization plan/evaluation results due to ASTHO/CDC	BRDI Research Analysts or Bureau Chief	September 30, 2017		
Email to LPHAs announcing the <i>HEpi Profile</i> has been published	BRDI Research Analysts or Bureau Chief	September 30, 2017		Pending approval of the profile by the Office of Public Information
2017 Annual Clinical and Quality Conference	TBD	October 12- 13, 2017 Branson		
Epi Grand Rounds	BRDI Research Analysts or Bureau Chief	October 23, 2017		

RE-Entry (Corrections) Conference in November	TBD	November, 2017		
CPPG 4 <sup>nd</sup> Quarter Meeting	Angela McKee, Research Analyst IV  Hepatitis Epi Spec (currently vacant)  Debby Hutton, Research Analyst II  Anna Long, Health Education Supervisor	TBD		Presentation & Post-published Survey via ARS  For Survey, see Attachment A

Action steps will continue to be added to this table as team meetings are scheduled, conversations take place with stakeholders and partners, and communication and engagement opportunities are researched.

\*Although ASTHO grant funding will end on September 30, 2017, DHSS continues to make plans beyond that date which will be funded by other sources.

## Appendix B: Maintenance Plan



## **Missouri Department of Health and Senior Services**

### **Viral Hepatitis Epidemiologic Profile: Maintenance Plan**

**June 2017**

# Maintenance Plan

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5: Possible Project Risks ..... 3

# Maintenance Plan

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## 1: Purpose of the Maintenance Plan

The following plan is designed to provide guidance for the regular and routine updating of the Missouri Department of Health and Senior Services' (DHSS) *Epidemiologic Profile of Viral Hepatitis in Missouri (HEpi Profile)*. It is important for the *HEpi Profile* to maintain currency as its purpose is to document, interpret, and frame the dimensions of the hepatitis epidemic in local terms that can be used to heighten awareness and drive decision making.

## 2: HEpi Profile Background

The first version of the *HEpi Profile* was created in the spring of 2017 and published later that summer. It was funded in part through the Association of State and Territorial Health Officials (ASTHO) grant, *Building State/Territorial Health Department Capacity to Develop and Utilize Viral Hepatitis Epidemiologic Profiles*. The grant was awarded on January 3, 2017. It was originally scheduled to end on June 30, 2017, but was later extended to September 30, 2017. This short timeframe for production of the *HEpi Profile* placed limits on the scope and content of the first profile.

In accordance with grant deliverables, the [Utilization Plan](#) was created. Part of the plan called for stakeholder feedback, which was gathered from local public health agency (LPHA) staff and the Missouri Comprehensive Prevention Planning Group (CPPG).

Due to the timing of the grant period, 2015 surveillance data were used as they were the most recent data available. The document title includes the year of the surveillance data and not the published date to be consistent with other documents and reports produced by the Bureau of Reportable Disease Informatics (BRDI). Several other data sources were also incorporated into the profile and the most recent data available were used. The data were analyzed using SAS and Excel. The profile was compiled in Publisher and converted to a PDF document. The finalized and approved document is housed on the DHSS website at <http://health.mo.gov/data/hivstdaids/data.php>.

After the *HEpi Profile* is completed, stakeholders will again be asked for feedback to determine what needs are met by the report and what gaps still exist. The [Evaluation Plan](#) was created to guide measurement of the impact and usage of the *HEpi Profile*. The Evaluation Plan also contains a Lessons Learned section to assist in improving the process for creating future editions of the *HEpi Profile*.

## Maintenance Plan

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### 3: Resources Required for Maintaining the *HEpi Profile*

The resources required for maintenance of the *HEpi Profile* include staff and staff time, information technology, and funding. Each of these items is outlined below.

For the routine and regular maintenance of the *HEpi Profile*, the original *HEpi Profile* team can be broken into two subgroups, the principal staff and the administrative staff, based on responsibilities. The principal staff would be comprised of staff who can expect to spend significant amounts of time on the project and would be the ones who actually create the *HEpi Profile* document. The administrative staff would be comprised of those who would spend less time on the overall project as they would be providing general oversight and review of the finished product.

Principal staff:

- Viral Hepatitis Epidemiology Specialist – *HEpi Profile* project lead and coordinator
- Research Analyst II – *HEpi Profile* technical lead
- Viral Hepatitis Senior Office Support Assistant – clerical support for *HEpi Profile* project

Administrative staff:

- BRDI Bureau Chief – overall responsible party for the *HEpi Profile* project
- Research Analyst IV – responsible for technical oversight
- Epidemiology Team Senior Epidemiology Specialist – responsible for epidemiological oversight
- Viral Hepatitis Program Manager – contributor for programmatic input and needs
- Health Education Supervisor – contributor for document design and dissemination

Information technology resources that will be needed to update the *HEpi Profile* include access to network drives and specialized software.

Network drives:

- N:\HARS\Hepatitis Epi Profile – This is a restricted-access drive and is where all data sources are kept as they may contain personally identifiable information (PII).
- I:\CPHDivision\DP\ASTHO – The drafts and final copies of the *HEpi Profile* itself and all administrative documents that the whole *HEpi Profile* team may need to access are stored in this shared folder. This is not a restricted drive and should not contain PII.

Specialized Software:

- ArcGIS – map creation
- SAS – extraction of data sets and data analysis
- Adobe Acrobat DC – finalization of the *HEpi Profile*



## Maintenance Plan

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Funding considerations for the maintenance of the *HEpi Profile* include salaries of staff who work on the project, especially those who are classified as principal staff. Funding for network fees and software licenses is also needed. Printing and travel expenses should be included in the funding as required to present and promote the *HEpi Profile*, garner stakeholder feedback, and update and print fact sheets.

### 4: Updates and Process Timeline

The *HEpi Profile* is to be updated on a yearly basis after surveillance data are finalized for the year. The final data tables are normally signed by the Missouri State Epidemiologist in June. The timeline below outlines the yearly process and suggested timeframes for completion of the *HEpi Profile*.

- June
  1. Kickoff meeting with all *HEpi Profile* team members to review stakeholder feedback and evaluation plan documentation with special consideration to the Lessons Learned section. Discuss feedback and brainstorm for any changes needed for the new version.
  2. Set biweekly or monthly update meetings to review processes and discuss challenges and successes with the team.
  3. Request all data sets from other bureaus, units, organizations, or agencies.
  4. Create project timeline.
  5. Review previous year's SAS code and spreadsheets and update for current year as needed.
  6. Begin analysis of data.
- July through August
  7. Continue data analysis.
  8. Write narratives.
  9. Compile complete *HEpi Profile*.
- September
  10. Send completed *HEpi Profile* to administrative staff for review and comment.
  11. Send completed *HEpi Profile* through the chain of command to the Office of Public Information for approval for distributing.
  12. Review and update Utilization, Maintenance, and Evaluation Plans.
  13. Update fact sheets as needed.
  14. Disseminate *HEpi Profile*.

### 5: Possible Project Risks

The following are possible risks to the continued routine updating of the *HEpi Profile*. The probability of the risk occurring and the impact of the risk are noted as high, medium, or low. A risk with a low impact will only affect the timeline by approximately a week, a medium impact would be expected to impact the timeline by two weeks, and a high impact item would be expected to affect the timeline by greater than two weeks.

## Maintenance Plan

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- Risk: Administrative staff turnover
  - Probability: Medium
  - Impact: Medium
- Risk: Principal staff turnover
  - Probability: Medium
  - Impact: High
- Risk: Tasks assigned to principal staff with a higher priority than the *HEpi Profile*
  - Probability: Medium
  - Impact: High
- Risk: Delay in access to requested data sets
  - Probability: Medium
  - Impact: High
- Risk: DHSS Network Outages
  - Probability: Low
  - Impact: Low

## Appendix C: Evaluation Plan



## **Missouri Department of Health and Senior Services**

### **Epidemiologic Profile of Viral Hepatitis in Missouri: Evaluation Plan**

**June 2017**

Evaluation Plan

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## Evaluation Plan

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### 1: Purpose of the Evaluation Plan

The following plan is designed to provide guidance for measuring the impact and utility of the Missouri Department of Health and Senior Services' (DHSS) *Epidemiologic Profile of Viral Hepatitis in Missouri (HEpi Profile)*. Measuring the impact and utility of the *HEpi Profile* will assure it meets the needs of stakeholders and effectively accomplished the goal of documenting, interpreting, and framing the dimensions of the hepatitis epidemic in local terms that will aid in heightened awareness and decision making in Missouri. The Evaluation Plan also provides a framework for continuous quality improvement.

### 2: HEpi Profile Project Background

The first version of the *HEpi Profile* was created in the spring of 2017 and published later that summer. It was funded in part through the Association of State and Territorial Health Officials (ASTHO) grant *Building State/Territorial Health Department Capacity to Develop and Utilize Viral Hepatitis Epidemiologic Profiles*. The grant was awarded on January 3, 2017. It was originally scheduled to end on June 30, 2017, but was extended to September 30, 2017. This short timeframe for production of the *HEpi Profile* placed limits on the scope and content of the first profile.

In accordance with grant deliverables, the [Utilization Plan](#) was created. Part of the plan called for stakeholder feedback, which was gathered from local public health agency (LPHA) staff and the Comprehensive Prevention Planning Group (CPPG). A [Maintenance Plan](#) was also created according to grant deliverables to assist with the regular and routine updating of the *HEpi Profile*.

Due to the timing of the grant period, 2015 surveillance data were used, as they were the most recent data available. The document title includes the year of the surveillance data and not the publication date to be consistent with other documents and reports produced by the Bureau of Reportable Disease Informatics (BRDI). Several other data sources were also incorporated into the profile, and the most recent data available were used. The data were analyzed using SAS and Excel. The profile was compiled in Publisher and converted to a PDF document. The finalized and approved document is housed on the DHSS website at <https://health.mo.gov/data/hivstdaids/data.php>.

### 3: Formative Evaluation

During the first cycle of creating the *HEpi Profile*, stakeholder feedback was sought at the very beginning of the process. After an initial [Table of Contents](#) was developed, it was combined with an introductory letter and a survey. The survey packet (Attachment A) was distributed to stakeholders at the 2017 DHSS/LPHA Public Health Conference and at a CPPG meeting. It was also sent to all LPHA Administrators through email. The pre-publication survey results can be found in Attachment B. Overall, the response was positive and encouraging. When quantified, the project plan received an average approval rating of 13.7 out of a possible 16, or an 85.9% approval rating.

## Evaluation Plan

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On May 15-17, 2017, staff participated in a series of focus groups with LPHA staff in the Southeast Planning Region, as it was highlighted as a vulnerable region in the *HEpi Profile*. The draft version of the *HEpi Profile*, along with proposed fact sheets, were presented and discussed with LPHA staff. The staff who participated reacted favorably to the draft and fact sheets. The agendas and a summary of the meetings can be found in Attachment C.

The Utilization Plan outlines strategies for disseminating the *HEpi Profile* to different groups through various media and communication tools. Some of the media and tools listed are news releases, social media, and distribution lists. The *HEpi Profile* will be published on the DHSS website.

### 4: Impact Evaluation

In order to measure the impact of the *HEpi Profile*, the pre-publication survey will be distributed again approximately two months after the release of the final *HEpi Profile*. CPPG and LPHA administrators will again be surveyed to see if the actual document meets their needs and expectations. The pre- and post-publication survey results will then be compared to determine the profile's strengths and weaknesses.

Included in the appendix of the *HEpi Profile* will be a feedback form. This form will collect data on the audience reached, clarity, impact, and usefulness of the document. The feedback form can be printed and returned via hardcopy or a link to an electronic form can be used. The data from this form will be used to see the impact and reach of the *HEpi Profile* and to inform decisions for future cycles of *HEpi Profile* creation.

### 5: Lessons Learned

After each cycle of *HEpi Profile* creation, a Lessons Learned session will be completed by the *HEpi Profile* team. This will allow the team to critically evaluate which processes and activities went well and can be continued and which could be improved. This will assist with completing future *HEpi Profile* cycles in the most efficient and effective ways possible. The Lessons Learned template and the initial responses can be found in Attachment D.





**Missouri Department of Health and Senior Services**

P.O. Box 570, Jefferson City, MO 65102-0570 Phone: 573-751-6400 FAX: 573-751-6010  
RELAY MISSOURI for Hearing and Speech Impaired 1-800-735-2966 VOICE 1-800-735-2466

Randall W. Williams, MD, FACOG  
Director



Eric R. Greltens  
Governor

March 17, 2017

Dear Viral Hepatitis Stakeholder,

The Bureau of Reportable Disease Informatics (BRDI) and the Bureau of HIV, STD, and Hepatitis (BHSH) are working together to create the first *Epidemiologic Profile of Viral Hepatitis in Missouri* (affectionately called the *HEpi Profile*). The purpose of this report is to increase public and professional awareness of viral hepatitis and to drive policies for viral hepatitis prevention, care and treatment. The *HEpi Profile* will document, interpret and highlight the scope and burden of the epidemic in Missouri and may be used to heighten awareness and drive decision making regarding viral hepatitis. This project is being funded through the Association of State and Territorial Health Officials (ASTHO) grant *Building State/Territorial Health Department Capacity to Develop and Utilize Viral Hepatitis Epidemiologic Profiles*. The *HEpi Profile* will be available for distribution in summer 2017.

Currently, the *HEpi Profile* is in the development stage and the workgroup needs your input to assure the information contained within the report is beneficial and will be utilized. Please take a few minutes to review the attached proposed Table of Contents for the *HEpi Profile*. Then, with consideration of your role in prevention, care, and planning for the viral hepatitis epidemic in Missouri, please complete the short survey that is attached. Your responses and comments will be used by the workgroup to enhance the content and scope of this, the first version of the *HEpi Profile*, and future versions.

Completed surveys should be returned by **March 31, 2017**, and can be returned by hardcopy or electronic means.

Mailing address: Bureau of Reportable Disease Informatics  
Missouri Department of Health and Senior Services  
PO Box 570  
Jefferson City, MO 65102

Fax number: (573) 751-6417

Email: [debby.hutton@health.mo.gov](mailto:debby.hutton@health.mo.gov)

If you have any questions regarding this survey or the *HEpi Profile* project, please contact BRDI at (573) 526-5271. Thank you for your time and assistance!

Sincerely,

A handwritten signature in black ink that reads 'Rebecca Mickels'. The signature is written in a cursive, flowing style.

Becca Mickels, Chief  
Bureau of Reportable Disease Informatics

[www.health.mo.gov](http://www.health.mo.gov)

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Geographic Distribution .....	N
Longitudinal Trends.....	N

### Section 4: Special Populations and Risk Factors

Barriers .....	N
Persons Under 30 Years of Age .....	N
Baby Boomers .....	N
Opioids and Injection Drug Use.....	N
Vulnerable Region: Southeast Planning Region .....	N
Vulnerable Region: St. Louis City and County .....	N
Incarcerated Population .....	N
Hepatitis C and HIV Disease Co-Infection.....	N
Hepatitis C and Sexually Transmitted Disease Co-Infection .....	N
Hepatitis C and Hepatitis B Co-Infection .....	N
Risks Factors .....	N

### Section 5: Care and Complications

Hepatitis C and Hepatocellular Cancer.....	N
Liver Transplantation.....	N
Hospitalizations .....	N
Mortality.....	N

### Next Steps.....

### Acknowledgments.....



# Epidemiologic Profiles of Viral Hepatitis in Missouri 2015

Appendix C continued  
Attachment A continued



## 2015 Viral Hepatitis Epidemiologic Profile Stakeholder Survey

Group Name: \_\_\_\_\_

Date: \_\_\_\_\_

Based on the Table of Contents and samples provided:

Question 1.)

The overall content as it relates to Viral Hepatitis in Missouri appears to be:

- ☐ Highly effective and is complete and encompassing
- ☐ Somewhat effective and is complete but needs added details
- ☐ Somewhat ineffective as some sections are underdeveloped
- ☐ Highly ineffective as important content and details are lacking

Question 2.)

The overall content as it relates to Viral Hepatitis in Missouri would be:

- ☐ Very helpful to our group
- ☐ Somewhat helpful to our group
- ☐ Slightly helpful to our group
- ☐ Not helpful to our group

Question 3.)

The overall content as it relates to Viral Hepatitis in Missouri would be:

- ☐ Used by our group several time a year
- ☐ Used by our group occasionally in a year
- ☐ Used by our group rarely in a year
- ☐ Never used by our group

Question 4.)

The overall content as it relates to Viral Hepatitis in Missouri would be:

- ☐ Distributed to several populations by our group
- ☐ Distributed to only a few populations by our group
- ☐ Distributed to only one or two populations by our group
- ☐ Would not be distributed by our group

Question 5.)

Which, if any, Viral Hepatitis Fact Sheets would be useful to your group:

Rank 1-4 (Select and rank all that apply)

- |  |   |
|--|---|
|  | Hepatitis C and Baby Boomers (Persons born between 1945 and 1965) |
|  | Hepatitis C and Person Who Inject Drugs (PWID)                    |
|  | Hepatitis C: Known Risks  |
|  | Other (Please specify):   |

Comments/Suggestions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Survey Results April 20, 2017





# Survey Results

- 91 results returned as of April 20, 2017
  - 45 Survey Monkey
    - 115 LPHAs surveyed
    - March 2017
  - 40 Audience Response System
    - CPPG Results
    - March 2017
  - 6 Hardcopy Results
    - LPHA Public Health Conference
    - March 21-23, 2017



# The Survey

 **Epidemiologic Profiles of Viral Hepatitis in Missouri 2015** 

**2015 Viral Hepatitis Epidemiologic Profile Stakeholder Survey**

Group Name: \_\_\_\_\_

Date: \_\_\_\_\_

Based on the Table of Contents and samples provided:

Question 1.) The overall content as it relates to Viral Hepatitis in Missouri appears to be:

- ☐ Highly effective and is complete and encompassing
- ☐ Somewhat effective and is complete but needs added details
- ☐ Somewhat ineffective as some sections are underdeveloped
- ☐ Highly ineffective as important content and details are lacking

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- ☐ Not helpful to our group

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- ☐ Used by our group rarely in a year
- ☐ Never used by our group

Question 4.) The overall content as it relates to Viral Hepatitis in Missouri would be:

- ☐ Distributed to several populations by our group
- ☐ Distributed to only a few populations by our group
- ☐ Distributed to only one or two populations by our group
- ☐ Would not be distributed by our group

Question 5.) Which, if any, Viral Hepatitis Fact Sheets would be useful to your group:

Rank 1-4 (Select and rank all that apply)

	Hepatitis C and Baby Boomers (Persons born between 1945 and 1965)
	Hepatitis C and Person Who Inject Drugs (PWID)
	Hepatitis C: Known Risks
	Other (Please specify):

Comments/Suggestions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# The Results

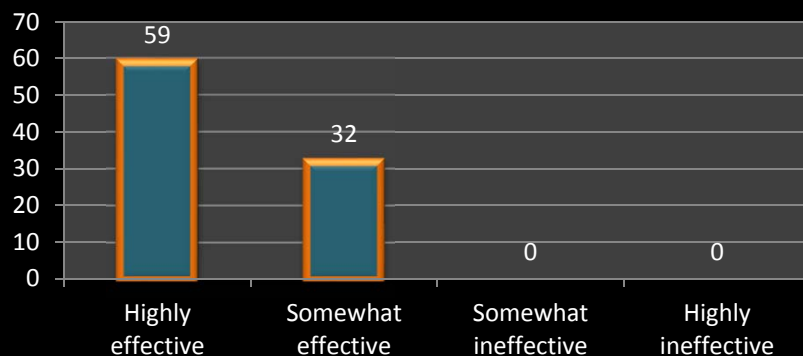
HIGHEST POSSIBLE RATING: 16  
LOWEST POSSIBLE RATING: 4  
AVERAGE RATING: 13.73

Total Returned  
Results: 91

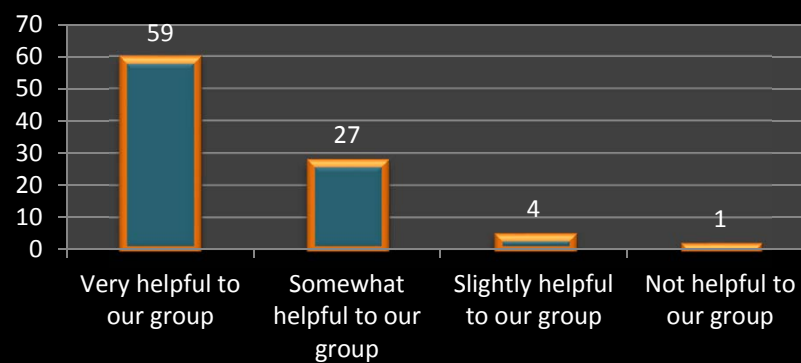
Overall  
Percentage  
85.6%  
(13.73/16=85.8)



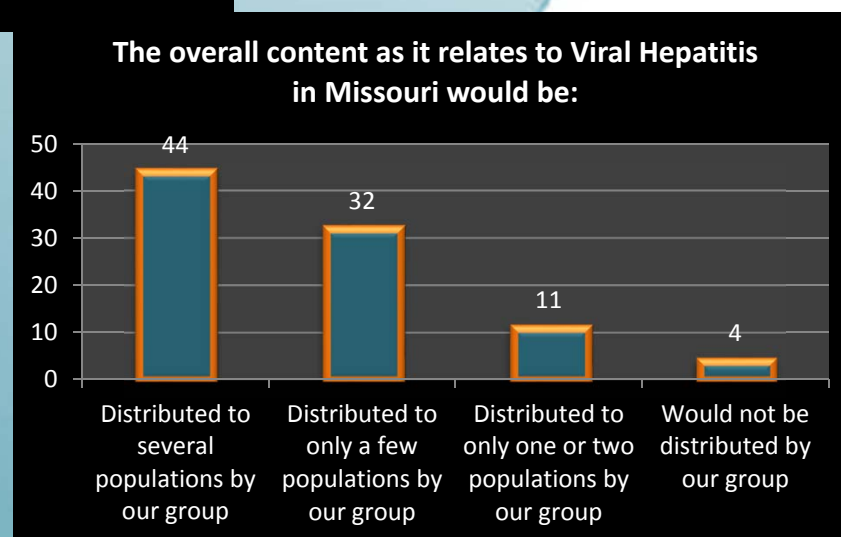
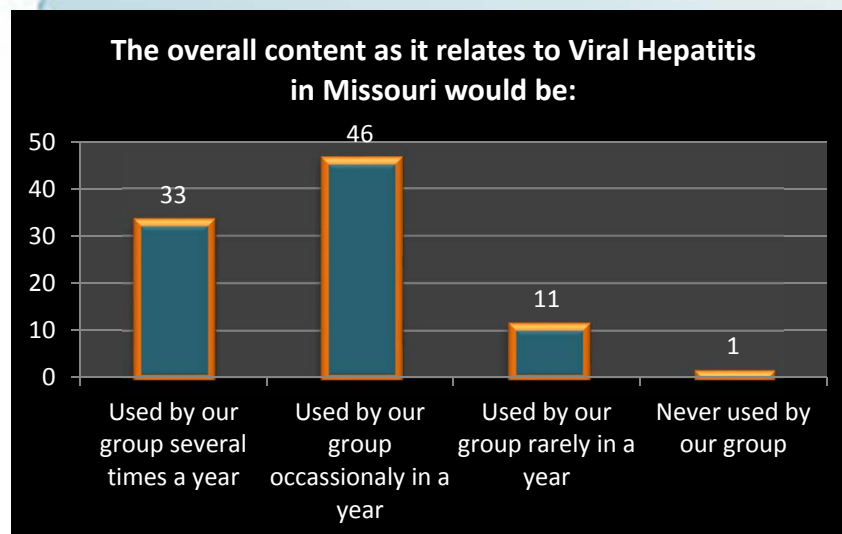
**The overall content as it relates to Viral Hepatitis  
in Missouri appears to be:**

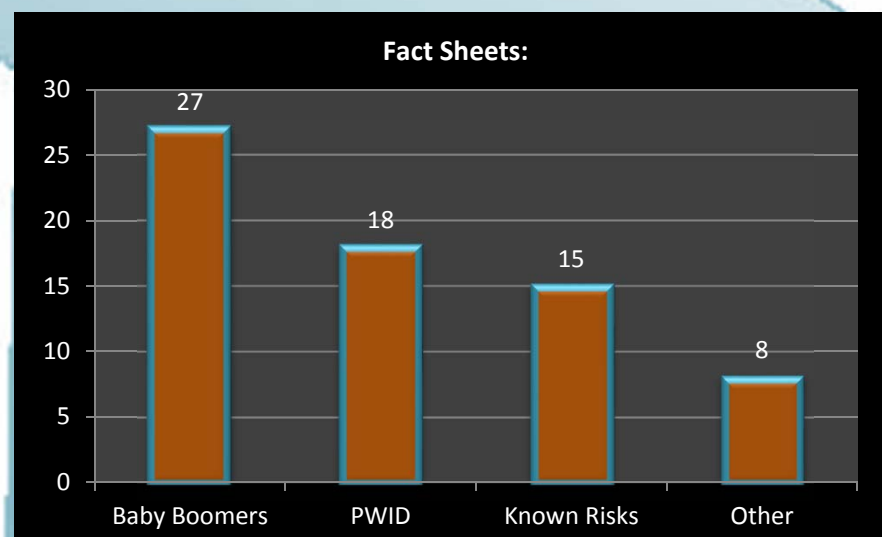


**The overall content as it relates to Viral Hepatitis  
in Missouri would be:**











# Fact sheets

- Suggestions from stakeholders
  - Prenatal/Perinatal Issues with Hepatitis
  - Incarcerated Populations
  - Testing and Treatment



**A special Thank You to Anna for  
making this process so easy and  
professional!!**



Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Monday, May 15, 2017  
St. Francois County Health Center

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey Update: New thoughts regarding survey questions after seeing more complete document	St. Francois County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	St. Francois County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	St. Francois County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
[linda.ball@health.mo.gov](mailto:linda.ball@health.mo.gov)

Debby Hutton, MBA  
Research Analyst II  
Bureau of Reportable Disease Informatics  
(573) 751-6470  
[debby.hutton@health.mo.gov](mailto:debby.hutton@health.mo.gov)

Zana Stephenson  
Epidemiology Specialist  
Bureau of Reportable Disease Informatics  
(573) 522-2177  
[zana.stephenson@health.mo.gov](mailto:zana.stephenson@health.mo.gov)



Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Monday, May 15, 2017  
Ste. Genevieve County Health Department

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey	Ste. Genevieve County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Ste. Genevieve County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Ste. Genevieve County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
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Research Analyst II  
Bureau of Reportable Disease Informatics  
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Epidemiology Specialist  
Bureau of Reportable Disease Informatics  
(573) 522-2177  
[zana.stephenson@health.mo.gov](mailto:zana.stephenson@health.mo.gov)



Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Tuesday, May 16, 2017  
Scott County Health Department

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey	Scott County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Scott County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Scott County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
[linda.ball@health.mo.gov](mailto:linda.ball@health.mo.gov)

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Zana Stephenson  
Epidemiology Specialist  
Bureau of Reportable Disease Informatics  
(573) 522-2177  
[zana.stephenson@health.mo.gov](mailto:zana.stephenson@health.mo.gov)



Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Tuesday, May 16, 2017  
Cape Girardeau County Public Health Center

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey Update: New thoughts regarding survey questions after seeing more complete document	Cape Girardeau County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Cape Girardeau County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Cape Girardeau County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
[linda.ball@health.mo.gov](mailto:linda.ball@health.mo.gov)

Debby Hutton, MBA  
Research Analyst II  
Bureau of Reportable Disease Informatics  
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Zana Stephenson  
Epidemiology Specialist  
Bureau of Reportable Disease Informatics  
(573) 522-2177  
[zana.stephenson@health.mo.gov](mailto:zana.stephenson@health.mo.gov)





Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Tuesday, May 16, 2017  
Butler County Health Department

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey Update	Butler County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Butler County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Butler County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
[linda.ball@health.mo.gov](mailto:linda.ball@health.mo.gov)

Debby Hutton, MBA  
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Zana Stephenson  
Epidemiology Specialist  
Bureau of Reportable Disease Informatics  
(573) 522-2177  
[zana.stephenson@health.mo.gov](mailto:zana.stephenson@health.mo.gov)



Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Wednesday, May 17, 2017  
Howell County Health Department

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey Update: New thoughts regarding survey questions after seeing more complete document	Howell County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Howell County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Howell County Staff
15 minutes	Wrap-up	All

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Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
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Agenda for *HEpi Profile* and HCV Fact Finding Discussion  
Wednesday, May 17, 2017  
Pulaski County Health Center

Time	Topic	Presenter
15 minutes	Introductions	All
10 minutes	Overview of the <i>Epidemiologic Profile of Viral Hepatitis in Missouri-2015 (HEpi Profile)</i>	Zana Stephenson
10 minutes	<i>HEpi Profile</i> Survey	Pulaski County Staff
10 minutes	Overall Survey Results	Debby Hutton
15 minutes	<i>HEpi Profile</i> Next Steps	Zana Stephenson
20 minutes	Overview of County Vulnerability	Linda Ball
10 minutes	HCV Testing Practices and Procedures: What testing for HCV is being done currently?	Pulaski County Staff
15 minutes	Barriers faced for hepatitis testing/referrals/treatment	Pulaski County Staff
15 minutes	Wrap-up	All

**Contact Information:**

Linda Ball, RN  
Viral Hepatitis Prevention Manager  
Bureau of HIV, STD, and Hepatitis  
(573) 751-6439  
[linda.ball@health.mo.gov](mailto:linda.ball@health.mo.gov)

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Bureau of Reportable Disease Informatics  
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SEMO *HEpi Profile* and 1702 Grant Trip Summary  
May 15-17, 2017

**Location:** St. Francois County Health Center, Park Hills, MO

**Attendees:** Jessica McKnight, Taylor Burch, Katie Nicholson, Mandy Harris, Amber Elliott, Liz Maserang, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They do test for hepatitis C (HCV) through Hep C Alliance's free testing. They submit approximately 10 tests per month. They have approximately 1 positive test for every 20 submitted.
  - They believe they have a pretty good number of HCV and HIV (Human Immunodeficiency Virus) co-infected clients. Their HIV case managers get the clients tested for HCV and hepatitis B virus (HBV).
  - They are working to join St. Louis County's Prescription Drug Monitoring Program (PDMP).
  - They refer positive HCV clients to St. Louis University for further testing and treatment, but they have no way to track how many clients actually follow through with the providers. They do not have the funding to do HCV case management or follow-up.
  - They feel their providers need more education on HCV. Linda will send them the information for the HCV ECHO (Extension for Community Health Outcomes) program.
  - They shared that it was too difficult to get rapid HCV tests to their facility and stored there. If they need any, they just ask Butler County Health Department to bring them.
  - They suggested creating a toolkit for post-test counseling of HCV positive clients as they feel the way it is currently done is incomplete and would like the resource.
  - They reacted positively to the *HEpi Profile* draft and fact sheets. They would like a county-level fact sheet. They stated that both the *HEpi Profile* and fact sheets would be beneficial and useful to them.
- 

**Location:** Ste. Genevieve County Health Department, Ste. Genevieve, MO

**Attendees:** Diana Giesler, Mary Roth, Jennifer Mueller, Sandra Bell, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They do not test for HCV through Hep C Alliance's free testing. They only test for HCV if the client is willing to pay for it. They stated they did not test through Hep C Alliance since they do not have an electronic medical record and Hep C Alliance charged for testing. They stated that they were unaware that testing is free again. Linda will send the contact information for Hep C Alliance to the administrator.
- For those clients who do pay for testing and have a positive result, they offer hepatitis A and HBV vaccination. Linda will send the link to the free literature the Viral Hepatitis Prevention Program (VHPP) offers. All physicians in the area belong to Ste. Genevieve County Memorial Hospital. The hospital does not do any outreach for HCV and most of the clients cannot afford

the physicians' fees. Linda will send them the information for the HCV ECHO program but they indicated that their local providers would not be interested.

- They refer positive HCV clients to St. Louis University or Cape Girardeau County Public Health Center for further testing and treatment. They stated the wait lists for these clinics were very long.
- They reacted positively to the *HEpi Profile* draft and fact sheets. They would like a county-level fact sheet. They stated that the *HEpi Profile* might possibly be useful to them. They did state the fact sheets would be beneficial and useful to them.

---

**Location:** Cape Girardeau County Public Health Center, Cape Girardeau, MO

**Attendees:** Jane Wernsman, Jeanette Legrand-Florek, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They run an HCV Clinic through their rural health clinic. They have four infectious disease doctors and two who see HCV+ patients through the clinic. Their clinic has served 21 clients in the first 6 months and they currently have 51 people on a waiting list. Their HIV Clinic tests for HBV routinely, and the doctors are very much in favor of vaccinating clients who are not infected. The HIV Clinic also does some HCV testing.
- They do test for HCV through Hep C Alliance's free testing. They submit approximately 15 tests per month. They have approximately one or two positive tests each month. Their county jail also brings clients over to be tested. They do not do rapid HCV tests.
- The most common risk factors they see are injection drug use (especially in 25-35 year olds), tattoos, and high-risk sex.
- They are working to join St. Louis County's PDMP.
- Project ECHO presented at one of their quarterly LPHA Administrator meetings. Linda will send them the information for the HCV ECHO program.
- They said it would be helpful if we could share any funding opportunity announcements with them as they don't always have time to sit and look for funding opportunities.
- They reacted positively to the *HEpi Profile* draft and fact sheets. They would like a county-level fact sheet. They stated that both the *HEpi Profile* and fact sheets would be beneficial and useful to them. They also suggested creating a core PowerPoint presentation that could be modified to suit individual presentation needs.

---

**Location:** Scott County Health Department, Sikeston, MO

**Attendees:** Charlotte Griffin, Karen Evans, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They do not test for HCV through Hep C Alliance's free testing. They refer everyone who would like free HCV testing to another LPHA for testing. They are aware of the free testing through Hep C Alliance, but they stated that they do not have the time to do the testing. The administration says that other counties can provide the testing or they have Butler County Health Department staff come to do the testing. Anyone who comes in as HCV positive they refer to Amanda at Butler County Health Department.

- Linda shared information on Project ECHO and will send them the contact information on the project.
  - They had not heard of CDC's Vulnerability Report.
  - They did not know how helpful the *HEpi Profile* would be to them and that would be up to the administration. They did feel the fact sheets would be very helpful. They would like a referral and resources fact sheet. They were interested in a county-level fact sheet and a core PowerPoint that could be modified.
- 

**Location:** Butler County Health Department, Poplar Bluff, MO

**Attendees:** Chasidy Darnell, Susie Lyons, Robert Hudson, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They do test HCV through Hep C Alliance's free testing. They submit approximately 30 tests per month. They have approximately two positive tests each month. They use the rapid HCV tests provided by DHSS in the HIV clinic. If a client tests positive on a rapid test, they send the client to their clinic for the blood draw to be tested through Hep C Alliance. If the client is positive, they give referrals to providers who treat HCV. Their clinic always offers all STD, HIV, and hepatitis testing to everyone. They offer services regardless of where the client lives and are not compensated in any way from the other LPHAs for the services. They have been pushing for other LPHAs to do their own testing.
- They were not familiar with Project ECHO and there are not any primary care physicians they are in contact with who would be interested in participating. The providers in their area are not willing to see Medicaid patients. Many of their clients who are on a sliding fee scale cannot even afford those fees. Transportation to and from physicians and clinics is another major barrier to health care for the populations they serve.
- They are working to join St. Louis County's PDMP, which is now a board issue as the legislation failed last week.
- They reacted very positively to the *HEpi Profile* draft and the fact sheets. Robert specifically liked the maps with rates. He was interested in the county-level fact sheets as long as the data was presented "without asterisks" and was presented in such a way that laypeople would be able to understand the information. The clinical staff had favorable reactions to the fact sheets. Robert did not feel the fact sheets were enough to get people to test. He suggested a fact sheet that clearly describes the differences in acute versus chronic hepatitis C. He would like to see a fact sheet that answers the questions:
  - Why do we test?
  - What are the next steps for the client?
  - What resources are available to the client?
- Robert, who is the administrator of the LPHA, stated that he would like to partner with DHSS to enhance data collection. He would be willing to have staff do follow-up and be a pilot site for testing new methods of follow-up. He would be willing to assist with developing best practices and strategies for surveillance and testing. He would like to be part of mission and project focus

partnerships with us in regard to HCV. He is concerned that most of the people they are testing and identifying are chronic cases and not acute. He thinks they are testing the wrong population as the new infections are not occurring in the older, white, monogamous males that are coming into their clinic for testing.

---

**Location:** Howell County Health Department, West Plains, MO

**Attendees:** Carma Wheeler, Chris Gilliam, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:**

- They do test for HCV but not through Hep C Alliance's free testing. They do not want to do another lab requisition for each draw. They test 20-30 clients per month and have 2 positives out of those that they test. Most of their positives are brought over by their case workers as they are entering addiction treatment at Heartland Regional.
  - Linda will send them information on Project ECHO as they do not have any physicians who treat in their area.
  - Chris reacted positively to the *HEpi Profile* document. Carma thought the fact sheets would be beneficial in the clinic. Chris was interested in a county-level fact sheet.
  - They would like updates for funding opportunities. They are using brochures from the Centers for Disease Control and Prevention (CDC) and would like information regarding what brochures DHSS could provide.
- 

**Location:** Pulaski County Health Center, Crocker, MO

**Attendees:** Unknown Nurse, Linda Ball, Debby Hutton, and Zana Stephenson

**Conversation Highlights:** Even though an appointment was made through the administrator ahead of time, the nurse at the LPHA did not introduce herself and was unable to meet with us. She did tell us that they use the free testing through Hep C Alliance but that the system was cumbersome and not user friendly.

---

**Overall Impact:**

The impact of the trip as a whole was very positive. It allowed for DHSS and LPHA staff to personally interact and have dynamic, collaborative dialogue regarding HCV testing practices, resources available for treatment of those who are infected with HCV, and the *HEpi Profile* project and associated resources. Overall, the *HEpi Profile* was well received, especially the fact sheets. DHSS staff were able to share information on resources such as Hep C Alliance's free testing program, Project ECHO, and the ability of the Bureau of Reportable Disease Informatics' analysts to assist with communicable disease data requests. LPHA staff shared their successes and barriers to success with DHSS staff.



## Epidemiologic Profile of Viral Hepatitis in Missouri 2015



### Lessons Learned

#### HEpi Profile 2015

Date: 06/02/2017

Participants: Damon Ferlazzo (moderator), Debby Hutton (written submission), Becca Mickels, Angie McKee, Fei Wu, Linda Ball, and Zana Stephenson

Category	Practice/Issue	Problem/Success	Impact	Recommendation
<b>Communication and Client Partnership</b>				
	Grant Writing & NOA	There was a short turn-around time of less than 30 days. Becca, Angie, and Linda pulled together and were able to complete the grant application. The team used information previously written for the 1702 grant to save time and resources.		
	Communication and Plan	The grant writing team communicated well and mostly in person in order to get the application done in time. Communication was done very informally. During the project period, the communication plan and practices contained good concepts but they were not fully utilized.	Potentially High	From the top down (grantor level), more realistic and timely communications would have been very beneficial to the team.
	Lessons Learned/Best Practices	Lessons learned at the grant level could be beneficial if well executed.	Low	
	Other	New management encouraged applying for the funding opportunity. The grant was applied for and funding received.		
<b>Schedule and Budget - Definition &amp; Management</b>				
	Develop Grant Proposal	There was not enough time to think the budget through completely due to the short turn-around time.		





## Epidemiologic Profile of Viral Hepatitis in Missouri 2015



### Lessons Learned

#### HEpi Profile 2015

Date: 06/02/2017

Participants: Damon Ferlazzo (moderator), Debby Hutton (written submission), Becca Mickels, Angie McKee, Fei Wu, Linda Ball, and Zana Stephenson

Category	Practice/Issue	Problem/Success	Impact	Recommendation
	Develop/Monitor Budget	No one on the writing team had completed a budget previously, but Becca had assisted before. The team relied on Office of Financial and Budget Services (OFABS) staff for guidance on the budgeting. Becca, Linda, and Angie all gained valuable experience in budgeting that they will be able to use on future grant applications.		
<b>Human Resources Management</b>				
	Define Project Team	Staff changes had an impact on the project, but these were minimized due to the team taking detailed notes during the early planning sessions.	Low to Moderate	
	Establish and Manage Project Commitments	When writing the grant, having a better knowledge of who does what would have helped in assigning tasks.		
	Establish and Manage Project Roles and Responsibilities	Linda stated she felt like she pushed the tasks off on BRDI and she did not mean to do so. Roles were more fully defined as the project moved forward. It was difficult at times to move the project forward as project roles did not always align with daily chain-of-command.		Discuss roles earlier and acknowledge that project team roles may not coincide with chain-of-command.
<b>Scope Management</b>				



## Epidemiologic Profile of Viral Hepatitis in Missouri 2015



### Lessons Learned

#### HEpi Profile 2015

Date: 06/02/2017

Participants: Damon Ferlazzo (moderator), Debby Hutton (written submission), Becca Mickels, Angie McKee, Fei Wu, Linda Ball, and Zana Stephenson

Category	Practice/Issue	Problem/Success	Impact	Recommendation
	Initial Outline for Content	Angie compared Virginia's profile to our data sources and created an outline to follow. It was followed as closely as possible.		Additional data collection processes and/or agreements are needed going forward.
	Grant Requirements and Deliverables	Some of the early deliverables were not communicated clearly from the grantor. Debby took on the responsibility for and created the needed documents without any prompting from team leaders to assure the deliverable was met. Throughout the entire project, Debby did fantastic work. The team feels that our Viral Hepatitis Profile is comparable to other states' profiles.		Acknowledge efforts that go above and beyond with an internal award or nomination for Employee of the Month.
	Fact sheets	Anna created the fact sheets from drafts provided by Debby and Angie. It was difficult to reconcile individual writing styles. The internal team review process for the fact sheets was very long. These were very much a success and there has been a lot of enthusiasm for them.		
	Budget/Resources	Weekly meetings with minutes were helpful when writing invoice narratives.		



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Category	Practice/Issue	Problem/Success	Impact	Recommendation
	Drafts/Final Document	In the beginning of the drafting process, it would have been helpful to have clerical support for the compiling and formatting of the various sections. Publisher is very time consuming but was used as that is what Zana was most familiar with. Most stakeholders who have had the draft presented to them have stated that the final product should be helpful.		The 2016 HEpi Profile will be completed in MS Word.
<b>Quality Management</b>				
	Internal Review Processes	This was very disjointed in the beginning. More planning in the initial development phases would have been more helpful. The team had a lot of varied ideas, which leads to a quality product.		Having more group reviews of the document early in the project may assist with preventing rework of large pieces of the document.
	Management Review	The process does take a considerable amount of time, which was difficult with the condensed timeline of this project.		
	Grant Requirements and Review	ASTHO has not returned any feedback from the technical review to date.		
<b>Product Effectiveness</b>				



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### Lessons Learned

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Date: 06/02/2017

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Category	Practice/Issue	Problem/Success	Impact	Recommendation
	Southeast Missouri Trip	The trip went well. The project was well received at the sites. The one site we were unable to visit with was due to miscommunication within their LPHA. It was good exposure for BRDI and the HEpi Profile project.		Consider doing a webinar in the future to be able to reach more sites.
	Surveys	Anna with her ARS and Survey Monkey electronic surveys allowed for much better collection of the data. Anna was awesome!		
<b>Risk Management</b>				
	Staffing	Team members were new and unsure of expectations and processes.		Good documentation.
	Condensed Timeline	All team members worked with an "all hands on deck" mentality and were able to get the project completed. The experience gained by the team members this time will minimize this risk going forward.		
	External Partners	Communication from the grantor was a risk throughout this project as guidance was not always given prior to a deliverable being due. Stakeholder expectations and satisfaction with the project are worth noting as we have little regular communication with many of the CPPG members and LPHA staff.		



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### Lessons Learned



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<b>Best Practices</b>				
	Lessons Learned/Best Practices	Lessons learned at the team level will help solidify the success of this project and profile for years to come.		
	Setting up very detailed guidelines of what needs to be included in the profile will make the process much more efficient in future versions.			Creating templates where possible, standardizing groups and formats, etc., will save a great deal of time and lessen errors in the future.
	The team collaborated, built upon existing relationships, and worked with different groups than in their daily work. This allowed for a better product with more complete data.			

Updated Date: 08/08/2017